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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 36.] 1939. [No. 6.

SUMMARY OF RECENT ABSTRACTS.

V. LEISHMANIASIS.*

A. Visceral Leishmaniasis.

Epidemiology.

Cases of kala azar are described by various authors in France, Italy and China (p. 177). Péhu and Bertoye (p. 859) mention three children, from the Vosges, the Ardèche region and from the Grenoble area, suffering from kala azar. None of them had ever been to the endemic region in the south of France.

In the Naples area, Laurinsich (p. 858) found that infantile kala azar occurs endemically, and may be limited to one or two streets in a village. It commences most commonly in infants of 12 to 18 months and the first symptoms are most frequently seen from June to September, especially in the latter month. From 1916 to 1926 the numbers seen increased as treatment became popular, but since then have declined, probably owing to the influence of treatment.

Kala azar is widespread in the eastern half of the Province of Argolis, Greece, and Kirimlidis (p. 859) shows that it resembles the disease found in other endemic areas. In one group of villages it assumed epidemic form. Mollow (p. 866) records the definite diagnosis, by liver and bone marrow puncture, of the first autochthonous case of kala azar in southern Bulgaria, and thinks that the disease exists on the Black Sea coast.

Anderson (p. 858) shows that the number of cases reported from Tunisia has now reached 131, and discusses the epidemiology of the disease (in the original paper). In the Fung province of the Sudan, Henderson (p. 178) reports that the majority of cases of kala azar show their first symptoms between August and February. The disease attacks mainly children and young adults and is most liable to occur among those in a state of malnutrition, though cases occurred in the well fed police. A history of familial infection was not uncommon.

Tartaglia (p. 182) reports that 7–8 per cent. of dogs in Split were found to be suffering from kala azar. Human cases were commoner

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1938, Vol. 35. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

in villages than towns and *P. major* has been demonstrated wherever the cases occur. DONATIEN and LESTOQUARD (p. 872) studied the course of canine kala azar in Algiers. No symptoms may be shown for weeks or months, even in heavily infected animals ; rebate of symptoms may occur. Exposure to reinfection is constant and is sometimes followed by exacerbation of symptoms. Canine kala azar was found in 5 of 83 dogs examined in Dakar by CURASSON *et al.* (p. 871). One was in good health. LEE (p. 182) found kala azar in one stray dog of 90 examined in Peiping, and in a house dog associated with a child suffering from the disease.

Aetiology.

SANGIORGI (p. 177) reports the finding of two distinct types of parasite in a spleen smear from an adult patient with kala azar in Italy. The distinction between them was not that between *L. donovani* and *L. infantum.*

LAURINSICH (p. 177) adds goat's milk, after separation of fat, to the liquid of condensation of N.N.N. medium for the culture of leishmania. PAONI (p. 878) also uses goat's or cow's milk in place of blood, with N.N.N. medium, for the cultivation of leishmania from kala azar and oriental sore.

KHAW (p. 873) succeeded in infecting the mole rat (*Myospalax fontanieri*) and the ground squirrel (*Citellus dauricus mongolicus*) with *L. donovani* in N. China. DA CUNHA (p. 875) successfully infected the hamster, rhesus monkey and dog with the leishmania of S. American kala azar, and produced cutaneous lesions in the two latter animals by injecting cultures of the parasite of S. American cutaneous leishmaniasis. ADLER (p. 875) infected the Syrian hamster with cultures of S. American visceral leishmania. The old view that the leishmania could not infect laboratory animals (which was regarded as a differentiation from *L. donovani*) cannot therefore be maintained.

CHAGAS *et al.* (p. 873) review present knowledge of kala azar in South America. Leishmania were found in 41 of 47,000 specimens of liver examined by the viscerotomy service for yellow fever. The disease and the organism differ very little, if at all, from kala azar and *L. donovani* of the Old World, but the differences between the muco-cutaneous leishmaniasis of S. America and oriental sore are more pronounced. There is therefore more justification in differentiating *L. braziliensis* from *L. tropica* than *L. chagasi* from *L. donovani.* The distribution is fairly general in N.E. Brazil and the Chaco district of the Argentine. DEANE (p. 875) also notes the similarity of the kala azar of Brazil to that of the Old World.

Transmission.

SOUTHWELL and KIRSHNER (p. 860) maintain that proof of the infectivity of flagellate forms of *L. donovani* has not yet been obtained, and therefore that the transmission of kala azar is the result of the deposition on the skin of leishmania forms when an infected insect is crushed. WENYON, however, comments that successful infection has been produced by the bite of sandflies in India, and that fluid on which infected sandflies have fed, and which contains flagellate but not leishmania forms, is infective.

MALAMOS (p. 863) failed to transmit kala azar from hamster to hamster by the bite of the dog tick *Rhipicephalus sanguineus.* Successful infection by the injection of crushed ticks, therefore,

probably only indicates the capacity of leishmania to survive for varying periods in the gut of certain blood-sucking arthropods.

THEODOR (p. 862) records that one specimen of *P. langeroni* was found in a kala azar area of the Sudan. This is the first record of one of the *major* group from that area. SUN and WU (p. 861) found that 11 out of 537 *P. chinensis* examined in North China were naturally infected with *L. donovani*. Flagellates were found in the mid-gut, hind-gut and proventriculus. *P. chinensis* is the chief, if not the only, vector in that region. These authors also (p. 862) succeeded in infecting *P. chinensis* and *P. sergenti* var. *mongolensis* from man and hamsters, but the infection in the latter tended to die out when the blood was digested. RAYNAL (p. 862) also shows that *P. chinensis* is the most widespread species in North China. It is most abundant in June, and hibernates as a larva. It has been found infected in nature, is readily infected from man and hamsters and although transmission by bite has not been achieved, the intraperitoneal injection of crushed infected insects into hamsters easily produces infection.

Pathology.

PAI and HU (p. 867) have not found any evidence of leucolysin in kala azar to account for the reduction of leucocytes. They point out that a fallacy in counting leucocytes may arise from the tendency of these cells to adhere to glassware, and this accounts for most of the apparent reduction in numbers. These authors (p. 868) show that in infected hamsters there is anaemia and leucopenia, reduction in small lymphoid cells, increase in large lymphoid cells and also in polymorphonuclear neutrophiles due to extramedullary proliferation in the spleen and elsewhere. This does not occur in man.

As a result of agglutination tests, DA CUNHA (p. 866) concludes that leishmania possess thermostable flagellar antigens and thermolabile somatic antigens.

MALAMOS (p. 179) failed to immunize hamsters against *L. donovani* or to cure infection by giving immune serum prepared in rabbits, but the latter procedure tended to prolong the disease. The addition of immune serum to cultures tended to retard growth but there was no specific action. The same author (p. 180) reports an unusual course of *L. infantum* in producing infection in the pancreas of a white mouse.

Clinical.

By the use of Shortt's technique of producing straight-ended blood films in which numbers of leucocytes are gathered, WANG (p. 179) found leishmania in 39·1 per cent. of 23 proved cases of kala azar.

D'OELSNITZ (p. 869) in France, places most reliance on sternal puncture and on the increased density of the serum under the influence of organic antimony compounds, as judged by photometric methods, in the diagnosis of early kala azar. Bone marrow examination was successful in providing a diagnosis in a patient reported as having contracted kala azar in Valencia by LEMIERRE *et al.* (p. 865). The various serum abnormalities gradually disappeared under treatment.

Puncture of lymphatic glands has been a successful diagnostic procedure in four cases of childhood kala azar in the hands of GIRAUD *et al.* (p. 868).

GIRAUD and GAUBERT (p. 868) point out the dangers of spleen puncture and record three deaths. All other methods of diagnosis should first be attempted, but the risk of spleen puncture is less than

that of prolonged antimony treatment carried out on presumptive diagnosis alone. HENDERSON (p. 178) in 300 patients in the Sudan found leishmania always in the spleen, in 1 per cent. in the blood and in 7·5 per cent. in the nasal mucus.

SHORTT and SWAMINATH (p. 860) have found *L. donovani* in the nasal mucus of 6 of 15 further patients with Indian kala azar, and infected a hamster with one specimen. This patient came to Coimbatore from Malabar, in neither of which districts has kala azar previously been reported. [See also this *Bulletin*, 1936, Vol. 33, p. 16.]

ANDERSON and DISDIER (p. 869) found that the complement fixation test of Nattan-Larrier and Grimaud-Richard was not sufficiently specific to be of value in the diagnosis of kala azar. NICAUD *et al.* (p. 864) describe a patient with kala azar contracted in the south of France. The formol-gel test was intensely positive within a few seconds and the globulin and euglobulin level was markedly increased. Diagnosis was not made until over a year after the onset, and the infection was heavy. DEANE and DEANE (p. 184) found that the formol-gel test was positive within 4½ minutes in each of four patients with South American kala azar. In other diseases and in normal persons the shortest time was 11 minutes, and in the majority it was an hour or more. GASPERINI (p. 867) shows that, like the formol-gel reaction, the reaction of Caminopetros is modified if the serum is subjected to ultra-filtration before use. It would appear that the molecules of proteid responsible for these reactions are not all of the same size. The details of the test are given in the original abstract. Henry's reaction similarly does not occur with such serum.

RUDNEV (p. 859) diagnosed the first case of visceral leishmaniasis in Daghestan by Ray's reaction, Frey's adrenalin test and by finding leishmania in the monocytes of blood films. None was seen in spleen smears.

KIRK (p. 866) records simultaneous cutaneous and visceral leishmaniasis in a native of the Sudan. PANJA (p. 878) describes nodular lesions of the tongue in which leishmania were found. This appears to be the first time that tongue lesions have been described in dermal leishmaniasis following kala azar. WRIGHT (p. 178) shows that retinal haemorrhages into the posterior segment of the eye appear to be the only conditions having relation to kala azar and malaria. They probably depend on the severity of the anaemia rather than on the toxaemia.

PICCINELLI (p. 866) suggests that the rapid response to treatment of a case of typhoid fever with kala azar may have been due to some kind of antagonism between the two diseases. NAPIER (p. 178) considers that if kala azar is accompanied by some other disease, the kala azar should be treated first, but it is important to know that antimony treatment appears to aggravate pulmonary tuberculosis.

CHAGAS and ROMANA (p. 179) describe two cases of a disease resembling kala azar, with leishmania in the endothelial cells of liver and spleen puncture material, in the Argentine.

DE OLIVEIRA (p. 874) describes typical kala azar in a boy in Brazil, cured by fouadin and neostibosan, and CHAGAS and CHAGAS (p. 875) discuss the epidemiological features of this case.

Treatment.

ERMEN (p. 870) showed that the activity of the pentavalent compounds is associated with a histiocyte response in the blood, and

the beneficial action in kala azar is probably due to a double action, one on the parasites and one on the tissues. Trivalent compounds like fouadin are inactive.

KIKUTH and SCHMIDT (pp. 182, 870) used the European hamster for testing drugs, controlling infection by liver puncture and serological tests. By giving solustibosan, the toxicity of which is low, larger amounts of antimony can be administered than in the case of other pentavalent organic compounds. One cc. contains 20 mgm. antimony, and 6 cc. corresponds to 0·39 gm. neostibosan. WANG and LEE (p. 871) found that it is possible to give to Chinese hamsters much larger doses of antimony than were used by certain earlier workers. Thus, 0·4 gm. neostibosan per kilo. body weight subcutaneously or intramuscularly twice weekly to a total of 7 gm. per kilo. cured 50 per cent. of the infected animals.

WEESE (p. 180) found that solustibosan, in reasonable doses, does not produce local irritation on injection. The dog excretes 80 per cent. of the antimony in 24 hours, as against 50 per cent. when neostibosan is used. STRUTHERS (p. 180) agrees with WEESE that the mouse will tolerate more antimony in the form of solustibosan than in that of neostibosan. He gives in man intravenous injections of 2 cc. (42 mgm. antimony) followed by 6 cc. on alternate days (or sometimes daily) to a total of 59 to 84·5 cc. Solustibosan will cure kala azar and is relatively non-toxic. Solustibosan was tried in the treatment of 10 patients by NAPIER *et al.* (p. 181). It contains 20 mgm. antimony in 1 cc., and was given intramuscularly, either daily or on alternate days, to a total of 0·96 to 1·74 gm. antimony. All were probably cured. YATES (p. 181) administers solustibosan to a total dosage of 60 cc. for every 100 lb. body weight. The daily dose may be increased and in 9 cases the course was completed in 5 days. In these progress was better than in those whose course was longer. Several adults were given injections of 20 cc. without showing toxic effects, and in all, 95·1 per cent. of 82 patients were discharged improved.

HENDERSON (p. 178) in the Sudan gives, as a routine treatment, a course of neostibosan followed by one or two courses of tartar emetic. Children respond readily. LAURINSICH (p. 858) in Naples uses tartar emetic, average number of doses 20 to 40, in infantile kala azar, and the mortality is now only 6·35 per cent. in treated cases. The drug is given twice weekly. He considers that tartar emetic is more active than the organic antimony compounds.

D'OELSNITZ (p. 869) uses ureastibamine for kala azar in the south of France and pushes it to the limit of tolerance so as to eradicate the infection by a single course and avoid producing antimony-resistant strains. Injections of liver extract appear to increase the tolerance to organic antimonials. The patient described by LEMIERRE *et al.* (p. 865) was successfully treated by ureastibamine after neostibosan had failed.

LE HULUDUT (p. 182) obtained satisfactory results in kala azar with anthiomaline. PANJA (p. 878) treats post-kala azar dermal leishmaniasis with concurrent pentavalent arsenic and antimony compounds.

PIGOURY (p. 872) notes the appearance of pustules breaking down to ulcers in dogs treated for kala azar by antimonials. Leishmania, probably concentrated owing to the inflammatory reaction, occur in the tissues of these ulcers.

Owing to the uncertainty as to the method of transmission of kala azar in the south of France, D'OELSNITZ (p. 869) considers that the only available methods of prevention are the early identification and treatment of cases.

B. CUTANEOUS LEISHMANIASIS.

Epidemiology.

A translation by Hoare (p. 876) of a paper by BOROVSKY in 1898 establishes that the latter and his colleague SHULGIN in Tashkent were the first to recognize the parasite of oriental sore [known as Sart sore or Pendeh sore], to give an accurate description of its structure, to realize its protozoal nature and to suggest its transmission by a blood sucking intermediate host.

VIGNE and DUSAN (p. 877) describe oriental sore in a man of 45 who had returned to Marseilles four months previously, after a visit to Crete. HOVNANIAN *et al.* (p. 183) describe an outbreak of oriental sore in a newly constructed refugee camp near Aleppo. Sandflies abounded during the construction work and within a year the disease appeared in 181 individuals in 45 of 127 families. Seven acquired it for a second time, but the attacks were mild. When the site was finally cleared the flies became less numerous and the incidence fell.

POGGI (p. 183) records cases of oriental sore in Abyssinian natives, and MONTI (p. 877) one in an Italian soldier in the same district. Certain nodular, ulcerative or eczematous lesions in the south of the Cameroons, suspected by HERVÉ (p. 877) as oriental sore, have now been proved by the discovery of leishmania. No evidence of visceral infection could be obtained.

Transmission and Pathology.

ADLER (p. 860) shows that a Cretan strain of *L. tropica* (normally transmitted by *P. sergenti*) only with difficulty infected *P. papatasi* when the flagellate emulsion ingested was made up with 50 per cent. inactivated rabbit serum, but did so readily with 10 per cent. serum. A Palestinian strain (normally transmitted by *P. papatasi*) caused infection of *P. papatasi* readily, regardless of the concentration of serum.

SINTON (p. 863) produced oriental sore in a European whom he inoculated with serosanguineous fluid containing leishmania from an ulcer on the nose of a dog in the Punjab. A volunteer inoculated from this European also developed a papule in which leishmania were found. From experiments with volunteers, BERBERIAN (p. 863) concludes that *Stomoxys calcitrans*, which readily feeds on oriental sores, is capable of transmitting infection mechanically, and that it may possibly transmit visceral leishmaniasis in the same manner.

BOGLIOLO (p. 183) points out that the granuloma caused by *L. tropica* is at times indistinguishable from tuberculous lesions of the skin. EVANS (p. 878) found leishmania in nodules, which resembled tuberculoides, on the arm of a man in Irak. GONZALEZ *et al.* (p. 184), studied the lymphangitis which occurred in 12 per cent. of cases of cutaneous leishmaniasis in Paraguay. Lymphadenitis is also present and the enlargement is due to proliferation of the reticulo-endothelial system with giant cell formation ; leishmania are constantly present.

Clinical.

BRUMPT (p. 879) describes a patient who had oriental sores on hand and foot and who developed complete blockage of the oesophagus.

This cleared under ureastibamine treatment and was probably one of the rare instances of mucous membrane involvement in oriental sore of the Old World.

Although cutaneous leishmaniasis in the Sudan resembles either post-kala azar dermal leishmaniasis or oriental sore, KIRK and DREW (p. 877) find that there is no clear distinction between the distribution of kala azar and oriental sore such as has been observed in India.

GASPERINI (p. 185) produced an allergic reaction with glandular enlargement by the injection of an antigen, prepared from cultures of *L. donovani*, in a patient showing ulceration of the lip. YOUNG (p. 184) describes an Indian woman with nodules and local anaesthesia of the skin, regarded as leprosy until leishmania were found. Tartar emetic ointment cured the condition.

GONZALEZ and OLIVERA Y SILVA (p. 183) describe cutaneous leishmaniasis in Paraguay.

Treatment.

MANSON-BAHR (p. 879) found good results to follow the use of cignolin (a refined product of chrysophanic acid) in the treatment of oriental sore. Cignolin paint (*q.v.*) may be applied daily to the sore, and for the more chronic cases cignolin ointment (*q.v.*) is used.

RAYMOND (p. 185) obtains the best results in oriental sore by thorough scraping under gas anaesthesia, applying pure carbolic, and covering with adhesive plaster or elastoplast for 14 days. When this is removed, complete healing is found in about 90 per cent. of cases. Repetition may be necessary. HOLMES (p. 185) also advocates this treatment, but found that trivalent antimonials were also effective.

C. Wilcocks.

LEISHMANIASIS.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

A. Visceral Leishmaniasis.

ABRAMOV (p. 443) finds that kala azar occurs quite commonly in children and adults in certain highly malarious districts of Yugoslavia.

ADLER *et al.* (p. 443) working in a town in Crete in which there were two centres, one of kala azar and one of oriental sore, found that *P. major* is the vector of the visceral disease and *P. sergenti* of the cutaneous. Flagellates from *P. sergenti* produced oriental sore in a volunteer. Canine kala azar is common in the areas of human disease, and in measures for eradication both house and street dogs must be dealt with. Various sandflies are described.

ARAR (p. 444) reports kala azar from Turkey. ROBINSON (p. 445) records the first case from Transjordan.

KIRK (p. 445) concludes that leishmaniasis is endemic in certain areas of the Sudan, sporadic in others. Visceral disease occurs in rural districts in the vicinity of water and vegetation, but oral and cutaneous infections may be found in the same areas. Immigrants are more susceptible than indigenous natives. *P. langeroni* is the only sandfly whose distribution bears relation to kala azar, but the existence of some reservoir host is possible.

SCHRETZENMAYR *et al.* (p. 445) describe an outbreak in troops in Canton which was apparently introduced by men from an endemic area in the north. Jaundice was a feature in a number of patients. Treatment with neostibosan and solustibosan was successful. No investigation on transmission could be done.

CHAGAS *et al.* (p. 446) investigated visceral leishmaniasis in Brazil. The clinical features are those seen in the Old World. No infection was found in 1,446 wild animals, but was discovered in 7 dogs and 1 cat. *P. longipalpis* was found. DA CUNHA (p. 447) re-emphasizes that the so-called *L. chagasi* cannot be differentiated from *L. infantum* or *L. donovani*, and that it can produce infection in hamsters, monkeys and dogs. He also (p. 447) demonstrated that these organisms are found to be identical by means of serological tests.

LWOFF (p. 447) shows that for growth, *L. tropica* and *L. donovani*, like *T. cruzi*, require ascorbic acid, haematin and an unknown substance present in serum. ARCHETTI (p. 448) found that Reichenow's medium of citrated blood and Ringer solution, used in the cultivation of trypanosomes, is very suitable for the growth of leishmania. GAVRILOV and LAURENCIN (p. 448) record success in cultivating leishmania in tissue cultures prepared from the embryo of the hamster.

FERREIRA *et al.* (p. 449) show that the parasite of S. American kala azar is able to develop in the sandfly (*P. intermedius*). These flies occur in and around the houses of patients. CHAGAS (p. 449) succeeded in infecting laboratory bred *P. intermedius* and *P. longipalpis* from a dog with a skin lesion due to *L. chagasi*.

KRISHNAN (p. 449) concludes from experiments that serum antibodies, lytic to *L. donovani in vitro*, have no curative properties *in vivo*.

GIRAUD and POINSO (p. 450) in the original paper, summarize present knowledge of kala azar. VALLETEAU DE MOUILLAC *et al.* (p. 450) describe a meningeal syndrome which they regard as having been due to kala azar.

CHUNG (p. 450) regards sternal puncture as the best method for diagnosing kala azar in hospitals, dispensaries and rural stations. The technique is given. DA CUNHA and DIAS (p. 451) describe the preparation of alcoholic leishmania antigen for serological work.

D'OELSNITZ (p. 451) details certain clinical features in kala azar and describes a treatment in which 34 gm. neostibosan was given during a period of 2½ months. D'OELSNITZ *et al.* (p. 451) give the highest tolerated doses of antimony preparations continued over long periods in the treatment of kala azar. With ureastibamine, 0·5 cgm. per kilo. body weight can be given daily until over half a gram per kilo. has been given, but careful watch for intolerance is necessary. WANG (p. 452) finds that in experimental kala azar much more antimony can be given in the form of solustibosan than of neostibosan or ureastibamine, but more is required for cure. MATHIESON and WATSON (p. 452) treated a patient successfully with stibamine glucoside (neostam) after failing with fouadin.

B. Cutaneous Leishmaniasis.

VIGNE (p. 452) wrote a general account of oriental sore.

VANNI (p. 453) found 300 cases of oriental sore in Abruzzi in three months of 1938. *P. macedonicus* is probably the vector. ESNAULT and LOUBET (p. 453) report the first case of oriental sore seen in South Oran for 12 years.

HIGOUMENAKIS (p. 453) considers that the parasite of oriental sore in endemic areas is actually that of kala azar which has lost virulence through many skin passages. Parasites from sporadic cases of oriental sore have retained much of their virulence and can produce visceral infections in animals.

SHALOM (p. 454) points out that scars left by oriental sores may lead to ectropion and its complications. CAWSTON (p. 454) describes a condition diagnosed as espundia in a Zulu.

PORTE (p. 454) found that although local treatment was unsuccessful, intravenous neostibosan rapidly produces cure. FLARER (p. 454) injects a solution of atebrin into the skin round oriental sores, and has thus cured 14 patients. CASTELLANI and AMALFITANO (p. 454) use a fuchsin paint locally. Sores healed in 2 to 3½ months in three cases. REYES ORIBE (p. 455) obtained very satisfactory results with large doses of fouadin combined with intravenous yatren in muco-cutaneous leishmaniasis. *C. Wilcocks.*

ABRAMOV (G. D.). Le problème du kala-azar chez l'adulte. [**Kala Azar in the Adult.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Oct. Vol. 30. No. 10. pp. 2201–2206. With 2 figs.

Since 1933 cases of kala azar have been regularly encountered in Yugoslavia in the district lying between Lake Scutari and the Adriatic Coast. During the four years up to 1936 the disease has been diagnosed in 13 children and in 7 adults. During 1937, 50 suspected cases were examined by means of blood films made from the lobe of the ear. In 16 of these leishmania were found. Of these, 7 were children and 9 adults. In some cases diagnosis was established by the discovery of leishmania in scrapings from cutaneous ulcers which were present, while in other cases positive cultures were obtained. It is evident that in the malarious districts where the observations were made kala azar occurs quite commonly amongst children and adults of all ages. *C. M. Wenyon.*

ADLER (S.), THEODOR (O.) & WITENBERG (G.). **Investigations on Mediterranean Kala Azar. XI. A Study of Leishmaniasis in Canea (Crete).**—*Proc. Roy. Soc.* Ser. B. 1938. Aug. 5. Vol. 125. No. 841. pp. 491–516. With 3 figs. [15 refs.]

Having established by a brief survey carried out in 1932 in Athens and the vicinity of Argos that the distribution of *Phlebotomus major* corresponded closely with that of kala azar and was, therefore, a probable vector of the disease, it was decided to test this point more thoroughly by an intensive study of one locality. For this purpose, Canea in Crete was chosen because it is a centre of both visceral and cutaneous leishmaniasis, the two diseases, however, occurring in different parts of the town. Hagios Joannis, a small district measuring 300 by 250 metres, and situated at the south-eastern corner of the town accounted for 70 per cent. of the cases of kala azar. This small focus is about 1 kilometre distant from the old Turkish town which is practically free from the visceral disease, though it is an intensive focus of the cutaneous infection. The most striking difference between the two districts is the presence of gardens and vegetation in the

former and their absence from the old town. A very intensive study of the sandflies in the two areas combined with experiments on the susceptibility of laboratory bred sandflies to infections with *Leishmania infantum* and *L. tropica* has shown that *Phlebotomus major* is the vector of the visceral disease and *P. sergenti* that of the cutaneous form. A single instance of natural sandfly infection was encountered. A specimen of *P. major*, captured near a house where an infected dog occurred, was found infected with flagellates indistinguishable from leishmania. Flagellates from a specimen of *P. sergenti* experimentally infected with *L. tropica* produced an oriental sore when inoculated into the scarified skin of a volunteer. Canine kala azar was found to be common in the areas where the human disease occurred, and it is concluded that the findings in Canea indicate clearly the rôle of the house dog in the maintenance of the disease. Owing to a rabies scare, street dogs disappeared and it was possible to examine house dogs alone. Of these, about 90 were examined and half of these came from the human endemic focus and amongst this half nine were found infected. It is evident that any attempt to eradicate kala azar by destruction of dogs must take into account both house and street dogs. A study of the disease in dogs revealed the interesting point that an infiltration of the larynx and vocal cords with infected macrophages was the cause of the inability of some of the animals to bark. It was also noted that infected dogs improved considerably in health when given a diet of fresh meat. A study of the skin infection in dogs both in ulcerated and unulcerated areas was made and observations on the infection rate of sand-flies fed on the animals was carried out. The percentage of *P. major* which became infected after feeding on infected dogs varied in different batches from 2 to 70. This sandfly differed in certain respects from the same species previously studied in Catania, while those kept in captivity behaved differently from the wild flies. The habits of *P. major* and other sandflies are described as also the methods adopted for keeping the flies alive in the laboratory and for trapping them. A single male of *P. laroussei* was captured and this has enabled the authors to give the first description of the male of this species. The closely related *P. canaaniticus* of Palestine is regarded as a variety of *P. laroussei*, which has been found in France, Naples and Crete.

The authors finally discuss the world distribution of visceral leishmanias in relation to sandflies, indicating where gaps in knowledge require filling and the lines along which further research should be conducted. *C. M. W.*

ARAR (Asim). Leishmaniose viscérale en Turquie. [**Kala Azar in Turkey.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Oct. Vol. 30. No. 10. pp. 2207–2210.

An enquiry into the existence of kala azar in Turkey has been commenced. Before 1937 three cases of the disease had been diagnosed in Istamboul. During 1937 five cases were encountered, all in children, while during 1938 up to the time of the report six further cases had been met with. The enquiry is being energetically carried out with a view to discovering the distribution of the disease. So far no canine cases have been seen. *C. M. W.*

ROBINSON (J. T.). **Notes on a Case of Infantile Leishmaniasis in Transjordan.**—*Jl. Roy. Army Med. Corps.* 1939. Jan. Vol. 72. No. 1. pp. 12–20. With 2 maps.

The author encountered a case of kala azar in a child two years of age in Zerka village in Transjordan but 60 miles north-east of the Jordan valley. This appears to be the first record of the disease in Transjordan, though OSTROWSKI and CANA'AN have described cases from Palestine. Observations on the sandflies revealed both *Phlebotomus papatasi* and *P. major*, the latter being probably the vector in this locality. *C. M. W.*

KIRK (R.). **Studies in Leishmaniasis in the Anglo-Egyptian Sudan. Part I.—Epidemiology and General Considerations.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Jan. 28. Vol. 32. No. 4. pp. 533–544. With 1 map. [34 refs.]

The author discusses the distribution, incidence, method of spread, and a number of other features of leishmaniasis, particularly kala azar in the Anglo-Egyptian Sudan. A number of interesting observations relating to these infections as they occur in that country are recorded and suggestions are made regarding the method of transmission and the possible occurrence of some reservoir host. The author's conclusions are mainly these. Leishmaniasis is endemic in certain areas, and is sporadic in others. Visceral, oral and cutaneous infections may co-exist in the same area but the visceral form is the commonest. In endemic areas, the visceral form occurs in rural districts in the vicinity of water and in the presence of vegetation. Military patrols visiting uninhabited or sparsely populated districts may contract the disease, which attacks immigrants to an endemic area more readily than the local inhabitants. An instance is recorded in which 20 men (27 per cent. of the patrol) went down with kala azar 3 to 6½ months after spending about a month in the Kapoeta endemic area near the Kenya border. An isolated endemic focus occurs in Darfur in the Western Sudan, while between it and the main focus in the Blue Nile is an area to the east of the White Nile in which sporadic cases occur from time to time. Here, isolated cases of the cutaneous and oral types have also been seen. As far as present knowledge goes, *Phlebotomus langeroni* is the only sandfly which, in its distribution, bears any relation to kala azar, but epidemiological evidence points to the possibility of the existence of some alternative or reservoir host.

C. M. W.

SCHRETZENMAYR (A.), CHUE SUFUI & TSEN HYEN-WUN. Kala-Azar-Epidemie im bisher Kala-Azar-freien Canton. [**Kala Azar Epidemic in Canton.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Oct. Vol. 42. No. 10. pp. 459–468. With 3 figs.

——. Extension du domaine géographique du kala-azar. Apparition d'une épidémie à Canton. [**Kala Azar Epidemic in Canton.**]—*Rev. Méd. Française d'Extrême-Orient.* 1938. Aug.–Sept. Vol. 20. No. 7. pp. 868–877.

In this paper is recorded an interesting outbreak of kala azar which occurred at the beginning of 1938 amongst Chinese troops in Canton,

where the disease had not previously been noted. The first case was diagnosed through the discovery of leishmania in a malaria patient. During the next five months a further 83 cases were identified. They were all in officers or soldiers except three, which were in women who, however, had been employed by the military authorities. A number of the cases were in men who had never left the Canton district, while others were in soldiers who had come from N. China, where the disease is endemic. It seems clear that the infection had been introduced with these men from N. China.

The disease appeared to follow the usual course, though association with malaria or other infections was common. In 24 of the cases jaundice was a feature. In one case there supervened a condition of acute atropy of the liver. As regards treatment, neostibosan or solustibosan was employed with good results in most cases. Three of the patients died as a result of serious complications.

Observations on dogs and sandflies in this area have not yet been carried out, but attempts to do so will be made as far as the exigencies of war permit. *C. M. W.*

CHAGAS (E.), DA CUNHA (A. Marques), FERREIRA (L. Castro), DEANE (L.), DEANE (G.), GUIMARÃES (F. N.), VON PAUMGARTTEN (M. J.) & SÁ (B.). Leishmaniose visceral Americana. (Relatorio dos trabalhos realisados pela commissão encarregada do estudo da Leishmaniose Visceral Americana em 1937). [**Report of American Kala Azar Commission for 1937.**]—*Mem. Inst. Oswaldo Cruz.* 1938. Vol. 33. No. 1. pp. 89–229. With 12 maps & 40 plates.

This lengthy report deals with a study of kala azar which was carried out in the municipality of Abialé in the State of Pará, Brazil, where during 1937 eight cases of the disease were discovered. The investigation involved the study of the cases clinically, a morphological and experimental investigation of the causative organism and a detailed epidemiological survey including the collection and examination of large numbers of insects and vertebrates of all kinds. Of the eight human cases seen, seven were in children, while one was in an adult. These do not appear to have revealed any features which have not been recognized in the well known kala azar of the Old World. The examination of captured wild animals, 1,446 in number, brought to light no cases of infection, but amongst domestic animals, 7 dogs and 1 cat were found infected. A very large number of biting insects of all kinds were collected. There were mostly mosquitoes but *Phlebotomus longipalpis* was captured on a number of occasions. All the details of the animal and insect examinations and the relationship of the human cases to the general population of the district are given in a series of comprehensive tables, maps and charts. A number of photographs shows the type of dwelling in which the cases occurred. These are mostly isolated thatched wooden huts standing alone amongst trees and scrub in, or at the margin of, the forest.

The whole investigation, judging from the mass of detail in the report, was carried out with the utmost care and thoroughness, and though nothing very new has come to light, the material thus made available may be of great service to future observers. *C. M. W.*

i. DA CUNHA (A. Marques). Infections expérimentales obtenues en partant de la leishmaniose viscérale américaine. [**Experimental Infections with S. American Visceral Leishmaniasis.**]—*C. R. Soc. Biol.* 1938. Vol. 129. No. 27. pp. 428–430.

ii. ——. Infecções experimentaes na leishmaniose visceral americana. [**Experimental Infections with S. American Visceral Leishmaniasis.**] —*Mem. Inst. Oswaldo Cruz.* 1938. Vol. 33. No. 4. pp. 581–598. With 9 plates. English summary.

i. In a previous communication the author and E. CHAGAS (this *Bulletin*, 1937, Vol. 34, p. 569) reported the failure to infect animals with the parasite of S. American kala azar. Further experience has shown the author that such infections can readily be produced if younger cultures of leishmania than those previously employed are used for inoculation. Up to the date of writing successful infection of hamsters (*Cricetus cricetus*), macaques and dogs has been effected, the last, however, only after injection of leishmania derived from naturally infected dogs. In the case of the hamsters there was a tendency to swelling of the feet, while the skin of the abdomen became roughened, erythematous and friable. Apart from these features the infections in the animals were similar to those produced by the parasites of kala azar from other countries. The successful infection of animals with *Leishmania chagasi*, the name given to the parasite of S. American kala azar, which, however, cannot be differentiated from *L. infantum* or *L. donovani*, has already been reported by the author himself and by ADLER (this *Bulletin*, 1938, Vol. 35, p. 875).

ii. In the second paper further details of the infections produced are given, while it is recorded that one dog had been infected with cultures of a human strain of the South American parasite. It is again emphasized that the parasite is identical with *Leishmania infantum*. *C. M. W.*

DA CUNHA (Aristides Marques). A agglutinação e o diagnostico differencial das leishmanias. [**Agglutination and Differential Diagnosis of Leishmanias.**]—*Brasil-Medico.* 1938. Sept. 17. Vol. 52. No. 38. pp. 849–855.

The author has carried out a number of serological tests with strains of *Leishmania donovani, L. infantum, L. tropica, L. brasiliensis* and the leishmania of the recently discovered S. American kala azar, for which the name *L. chagasi* has been suggested. His procedure has been to prepare, in rabbits, agglutinating sera for all the strains by injection of culture forms of the organism. With these sera and cultures of the various strains, absorption tests were made. The results of these are given in a series of eleven tables. The outcome has been that the author has come to the conclusion that the parasite of S. American kala azar is identical with that of the Mediterranean disease which bears the name *L. infantum*. *C. M. W.*

LWOFF (Marguerite). Le pouvoir de synthèse des leishmanies. [**The Synthetic Power of the Leishmanias.**]—*C. R. Soc. Biol.* 1939. Vol. 130. No. 5. pp. 406–408.

The author has already shown that blood necessary for the cultivation of *Trypanosoma cruzi* contains three essential substances,

of which two have been identified. These are haematin and ascorbic acid. The unknown substance is contained in the serum. As regards leishmania, most observers agree that blood is an essential constituent of all media which permit continued cultivation. The author finds that certain species of leishmania will not grow in peptone media containing serum alone, or washed red blood corpuscles alone, but that when both are present good growth occurs. The serum contains an unknown factor, but the washed red blood corpuscles contain haematin and ascorbic acid. Two species, *L. ceramodactyli* and *L. agamae*, both parasites of lizards, will grow perfectly well in peptone media to which haematin and serum has been added, whereas two strains of *L. tropica* and one of *L. donovani* required in addition ascorbic acid and thus have the same requirements as *T. cruzi*. It may be that the two lizard leishmania do not require ascorbic acid. On the other hand, it is possible that minute traces of this substance, or of some related substance, were actually present in the medium and that the differences noted between the different leishmanias are quantitative rather than qualitative as regards their need for ascorbic acid. One fact is clear, namely that all the trypanosomidae, whether parasites of animals or plants, require haematin. Furthermore, some of the more highly specialized forms like the trypanosomes of vertebrates and particularly those which have two hosts need in addition ascorbic acid and one or more unknown substances which are contained in serum. *C. M. W.*

ARCHETTI (Italo). Ein einfacher Nährboden für Leishmanien. [**A Simple Medium for Leishmania.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Dec. Vol. 42. No. 12. pp. 547–549.

The author has found that the medium employed by REICHENOW for the cultivation of trypanosomes is very suitable for the growth of leishmania. It is prepared as follows. Into a pointed centrifuge tube are introduced 1 cc. of citrated human blood (0·5 cc. of citrate solution and 0·5 cc. of arm blood) and 1 cc. of Ringer solution. The tube is then kept in the ice chest till the cells have settled to form a layer of red blood corpuscles covered by a layer of leucocytes. In this medium the leishmania multiply in the leucocyte layer where large numbers of flagellates free and in rosettes are found. *C. M. W.*

GAVRILOV (W.) & LAURENCIN (S.). Application d'une méthode de culture de tissus à l'étude des protozoaires. [**Application of a Tissue Culture Method to the Study of Protozoa.**]—*Ann. Soc. Belge de Méd. Trop.* 1938. Mar. 31. Vol. 18. No. 1. pp. 41–56. With 13 figs. on 7 plates. [13 refs.]

In this article the authors describe the successful cultivation of leishmania in tissue cultures prepared from the embryo of the hamster. The cultures were made up with heparinized blood, embryonal fluid and extract of spleen. To a mixture of these ingredients the embryonal tissue to be cultivated was added. The culture when established was inoculated with cultural forms of leishmania. It was possible to trace the penetration of the flagellates into the cells, their development into rounded leishmania forms and their multiplication. The various appearances are shown in a number of microphotographs of the infected tissue cultures. *C. M. W.*

FERREIRA (L. Castro), MANGABEIRA (O.), DEANE (L.) & CHAGAS (A. W.). Notas sobre a transmissão da leishmaniose visceral americana. [**Transmission of American Visceral Leishmaniasis.**]—*Hospital.* Rio de Janeiro. 1938. Nov. Vol. 14. No. 5. pp. 1077–1087. With 16 figs.

In this preliminary report the authors describe experiments which they have carried out with sandflies (*Phlebotomus intermedius*) and S. American kala azar. It has already been reported that in the Eastern part of Brazil, where endemic foci of kala azar exists, dogs and a cat, as well as human beings, have been found infected. Collecting sandflies which were observed to have fed on an infected dog, and dissecting them some days later, it was shown that development of leptomonads had occurred in the intestine of some of them. It is thus evident that the parasite of S. American kala azar is able, like other forms of leishmania, to develop in sandflies.

It is shown that the sandflies occur in and around the houses of kala azar patients, while their breeding places have been located near these houses. It was possible to breed the flies in the laboratory, and something of the technique employed for this purpose is described. Laboratory bred sandflies fed on an infected dog have so far failed to acquire an infection. The paper is illustrated by a number of photographs depicting breeding places of the flies, the apparatus used for laboratory rearing of flies, and other features of the work, which is being continued. *C. M. W.*

CHAGAS (A. W.). Infecção de "Phlebotomus intermedius" pela "Leishmania chagasi." [**Infection of** *P. intermedius* **with** *Leishmania chagasi.*]—*Brasil-Medico.* 1939. Jan. 7. Vol. 53. No. 1. pp. 1–2. With 2 figs.

Previous observations, noted in papers reviewed in this number, have shown that the parasite of S. American kala azar will undergo development into leptomonads in both *Phlebotomus longipalpis* and *P. intermedius.* These facts were ascertained by dissection of wild flies after they had fed on naturally infected dogs. In the present paper are described experiments with laboratory bred flies fed on an infected dog which revealed a skin infection with leishmania. Both *P. intermedius* and *P. longipalpis* were infected in this way.

C. M. W.

CALCUTTA: ANNUAL REPORT OF THE ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, 1937 [LAL (R. B.), Director].—[**Kala Azar** p. 25. KRISHNAN (K. V.).]

Normal human serum and serum from cases of kala azar have *in vitro* a lytic action on cultural forms of *Leishmania donovani.* These sera, as also that of rabbits immunized with a leishmanial vaccine, do not influence in any way the course of infection in mice produced by the inoculation of emulsion of heavily infected hamster spleens. Immune serum and neostibosan administered repeatedly to infected mice failed to bring about a cure. From these observations it appears that antibodies act on leishmania only *in vitro* and that their presence *in vivo* does not help in bringing about a cure. *C. M. W.*

GIRAUD (Paul) & POINSO (Robert). Diagnostic et traitement du kala-azar méditerranéen de l'enfant et de l'adulte. [**Diagnosis and Treatment of Mediterranean Kala Azar in the Child and the Adult.**]—*Marseille-Méd.* 1938. July 5–15. Vol. 75. No. 19–20. pp. 75–92.

This is a general account of kala azar based on 155 cases in children and adults seen in the south of France. It contains nothing new but is a good summary of present-day knowledge of all aspects of the disease.

C. M. W.

VALLETEAU DE MOUILLAC, DULISCOUET & DELACOUX DES ROSEAUX. Syndrome méningé au cours de la leishmaniose infantile. [**Meningeal Symptoms in Infantile Kala Azar.**]—*Arch. Méd. et Pharm. Nav.* 1938. July–Aug.–Sept. Vol. 128. No. 3. pp. 760–766.

The case described was a typical one of kala azar in a child of four years, the disease having apparently been contracted in Cherbourg, where it is becoming increasingly common. Treatment with neostibosan was instituted, it being the intention to give three courses with intervals of fifteen days between them. The response to the first course was immediate and satisfactory, but a day or two before the second course was commenced there was fever, and later, symptoms of meningitis, on account of which the second course which had been commenced was discontinued. Lumbar puncture yielded a purulent cerebrospinal fluid under pressure. The cells, chiefly polynuclears and lymphocytes, were so numerous as to be uncountable. As a precautionary measure 20 cc. of antimeningococcus serum was administered. It was found, however, that the fluid was bacteriologically sterile, while guineapig inoculations failed to reveal any tubercular infection.

A second lumbar puncture gave a fluid with fewer cells, while at a third a perfectly clear fluid was obtained. The meningeal symptoms disappeared and the course of antimony treatment was resumed. There was no further mishap, and the third course was given without any reaction, the child making a complete recovery. The origin of the meningitis is discussed and it is regarded as a rare and unusual manifestation of the leishmanial infection. *C. M. W.*

CHUNG (Huei-lan). **A Sternal Puncture Technic and its Clinical Value with Especial Reference to its Usefulness in the Diagnosis of Kala-Azar.**—*Chinese Med. Jl.* 1938. Nov. Vol. 54. No. 5. pp. 397–408. With 4 figs. on 2 plates. [13 refs.]

Since 1936 at the Peiping Union Medical College it has been the custom to practise sternal puncture for the diagnosis of kala azar or the study of the bone marrow cells. In all, 350 such punctures have been made and kala azar diagnosed 171 times. The author is convinced that sternal puncture is the best method for diagnosing kala azar in hospital, dispensaries and rural stations. After considerable experience the author has found that the best procedure is to use a shortened lumbar puncture needle, which is inserted in the mid line at an angle of 30 or 40 degrees at the level of the upper half of the second or third intercostal space. The needle, with the stylet in it, is pushed with a boring action through the anterior lamina. When the marrow cavity is reached the stylet is removed and a syringe for aspiration attached

to the needle. In the author's experience a local anaesthetic (novocain) is seldom necessary except with nervous individuals or patients over 30 years of age, whose sternal cortex is usually thick and hard.

C. M. W.

DA CUNHA (A. Marques) & DIAS (Emmanuel). Reacção de fixação do complemento nas leishmanioses. [**Complement Fixation in the Leishmaniases.**]—*Brasil-Medico.* 1939. Jan. Vol. 53. No. 5. pp. 89–92.

The authors have prepared a leishmania antigen by the following technique. The parasites are grown on the surface of blood agar plates for 8 to 15 days. The growth is scraped off and washed twice in physiological saline, following which the centrifuged deposit of leptomonads is shaken up with ten volumes of acetone. After one or two days the acetone is removed and the sediment dried completely at 37°C. The material is then triturated and weighed. To it is then added 1 cc. of absolute ethyl alcohol for each centigram, and the mixture placed at a temperature of 37°–40°C. for 20 days. The alcoholic antigen, which is then of a brown colour, may be kept at ordinary laboratory temperature or in the cold. *C. M. W.*

D'OELSNITZ. Le traitement d'attaque du kala-azar. [**Intensive Treatment of Kala Azar.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1939. Mar. 6. 55th Year. 3rd Ser. No. 7. pp. 321–324.

The case described is one of kala azar in a chamber-maid twenty-five years of age. The disease was apparently contracted in Nice. Treatment was carried out with neostibosan, which was administered almost daily for about two and a half months in doses of 0·5 gram till a total of just over 34 grams had been given. A complete cure resulted. The author notes particularly that this case illustrates certain features of the disease in adults to which he has called attention on a number of occasions. These are the slow development of the disease in a series of remissions and relapses, the character of the anaemia, the changes in hepatic function, the cutaneous pigmentation, the menstrual disturbances, the frequency of adenitis of the epitrochlear glands and the course of development of the various biological reactions.

C. M. W.

D'OELSNITZ, SAURIN, RAIBAUDI & DANIEL. Un nouveau cas autochtone de kala-azar de l'adulte. [**Endemic Kala Azar in an Adult.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1939. Mar. 6. 55th Year. 3rd Ser. No. 7. pp. 316–321.

The authors remind readers that during the last seventeen years in the South of France they have had under their care 150 cases of infantile and 15 cases of adult kala azar. They trace the development of their ideas regarding the best form of treatment till they reach the procedure which they now adopt, namely the administration as frequently as possible of the highest tolerated doses continued over a long period. In the case of ureastibamine, a dose of half a centigram per kilogram of body weight can be given daily till a total of over half a gram per kilo of body weight has been administered. During this

intensive treatment a careful watch has to be kept for signs of intolerance. With other organic antimony compounds the above doses may be exceeded. *C. M. W.*

WANG (C. W.). **Solustibosan and Ureastibamine in Treatment of Kala-Azar in Chinese Hamsters.**—*Proc. Soc. Experim. Biol. & Med.* 1938. Dec. Vol. 39. No. 3. pp. 418–421.

The author has tested the toxicity and therapeutic value of solustibosan to normal hamsters and to hamsters suffering from experimental kala azar, and has compared it with neostibosan and ureastibamine. In terms of the antimony content much more can be given in the form of solustibosan than in the form of either of the other two drugs, ureastibamine being the most toxic. As regards infected animals, much more antimony in the form of solustibosan was required to bring about a cure than either of the other two. In this respect, ureastibamine is the most and solustibosan the least potent of the three drugs. During the tests on infected animals more of them died after ureastibamine than after solustibosan, but this was the result of the greater ulceration caused by the first of these, both drugs being given subcutaneously owing to the impossibility of carrying out intravenous injections in hamsters. *C. M. W.*

MATHIESON (Don R.) & WATSON (B. A.). **Kala-Azar.**—*Jl. Amer. Med. Assoc.* 1939. Jan. 28. Vol. 112. No. 4. pp. 308–309. With 2 figs.

The case described is that of a Chinese student who was found to be suffering from kala azar after he had gone to the United States. He was treated with fouadin given intramuscularly on alternate days till 125 mgm. had been given. As this drug did not appear to be controlling the disease it was decided to try stibamine glucoside (neostam). A total of 2·06 gm. was administered (presumably intravenously) in forty-three days. A complete recovery occurred. During the fouadin treatment the patient's condition became so desperate that the treatment was stopped. The day following, the patient's temperature fell dramatically and his condition improved. The only toxic symptom noted during the neostam treatment was a non-productive cough which was easily controlled by codeine and epinephrine.

C. M. W.

VIGNE (Paul). Les leishmanioses cutanées: le bouton d'Orient. [**The Cutaneous Leishmaniases : Oriental Sore.**]—*Marseille-Méd.* 1938. July 5–15. Vol. 75. No. 19–20. pp. 93–103. With 5 figs.

A general account of oriental sore such as might have been written for a text-book of medicine. *C. M. W.*

FRÓES (Heitor Praguer). O problema da leishmaniose visceral e sua importancia para o estado de Sergipe. [**The Problem of Visceral Leishmaniasis.**]—*Brasil-Medico.* 1939. Feb. 25. Vol. 53. No. 9. pp. 311-317.

VANNI (Vittorio). Ricerche sulla leishmaniosi cutanea endemica negli Abruzzi. Nota preventiva. [**Researches on Endemic Cutaneous Leishmaniasis in Abruzzi.**]—*Ann. d'Igiene.* 1938. Sept.–Oct. Vol. 48. No. 9–10. pp. 520–528. With 7 figs.

Oriental sore has already been reported as common in the Province of Abruzzi on the East coast of Italy. The author reports that in the three months May to July 1938 he encountered there about 300 cases. These occurred mostly in the coastal rural districts with the exception that cases were less common on either side of the rivers which run from west to east through the province. Sandfly collections revealed two species, *Phlebotomus macedonicus* and *P. papatasi*. In sections of a specimen of the former species it was seen that the pharynx was packed with flagellates which had the structure of leptomonas. It seems clear that these represent developmental forms of *Leishmania tropica* and that this sandfly is a vector of oriental sore in the district.

C. M. W.

ESNAULT (P.) & LOUBET (R.). Sur un nouveau cas de bouton d'Orient observé dans le Sud oranais. [**A Fresh Case of Oriental Sore in South Oran.**]—*Arch. Inst. Pasteur d'Algérie.* 1938. June. Vol. 16. No. 2. pp. 210–212. With 1 plate.

The case described is a typical one of oriental sore in a young Arab who contracted the disease in the South Oran district of Southern Algeria. The interest of the case lies in the fact that it is the first to be seen in this area for 12 years, though medical men have been constantly in the district attending to the needs of the inhabitants. The last cases, five in number, were seen by CÉARD in 1924–1925, so that it would appear that for some unexplained reason the disease occurs in small outbreaks separated by long intervals of time.

C. M. W.

HIGOUMENAKIS (G. K.). Beitrag zur Studie der Beziehungen zwischen Haut- und Eingeweide-Leishmaniose (Orientbeule und Kala-azar). [**Relation between Oriental Sore and Kala Azar.**]—*Arch. f. Dermat. u. Syph.* 1938. Oct. 20. Vol. 178. No. 2. pp. 133–151. With 7 figs. [23 refs.]

The author gives a detailed account of several atypical cases of oriental sore in Greece which he regards as new types of the disease. The lesions in these cases were multiple and were of long duration. In one case there was a history of 15 years. In a case of kala azar in a child there appeared a number of skin lesions resembling oriental sore. Though leishmania were not found in these it is concluded that they were cutaneous manifestations of the generalized infection. This case leads the author to discuss the general question of the relationship of oriental sore to kala azar. He favours the view that the parasite of oriental sore in endemic foci of the disease is actually that of kala azar which through many skin passages has decreased in virulence and has thus ceased to produce generalized infections. The parasites from sporadic cases of the disease have, however, retained much of their virulence, as evidenced by their power of producing visceral infections in experimental animals. This long and somewhat discursive paper is illustrated by a series of excellent photographs showing the types of lesion described. *C. M. W.*

SHALOM (E.). **Effects of Scars of Baghdad Boils of the Lids.**—*Jl. Egyptian Med. Assoc.* 1938. Oct. Vol. 21. No. 10. pp. 678–680.

The author, writing from Baghdad, points out that the scars left by oriental sore of the eyelid may lead to ectropion and the various conjunctival and corneal complications which may follow this condition. In severe cases these may lead to blindness. *C. M. W.*

CAWSTON (F. Gordon). **Ulcero-Granulomatous Affection of the Nose in Zulus.**—*South African Med. Jl.* 1938. Nov. 26. Vol. 12. No. 22. pp. 854–855. With 1 fig.

The case described is that of a Zulu man 30 years of age who was suffering from a condition which had developed since childhood and had finally destroyed the whole upper jaw, nose, septum and left eye, exposing the uvula and epiglottis. The condition was diagnosed as espundia, though no leishmania could be found. Improvement in general health and in hearing, which had been affected, followed a series of antimony injections. *C. M. W.*

PORTE. La médication stibiée dans le traitement du clou de Biskra. [**Antimony Treatment for Oriental Sore.**]—*Ann. de Méd. et de Pharm. Colon.* 1938. July–Aug.–Sept. Vol. 36. No. 3. pp. 731–732.

Oriental sore is relatively common in Algeria, particularly in the palm groves between Biskra and Touggourt where it is known as "clou de Biskra." Local treatment has done little to influence the duration of the sores, which eventually heal spontaneously. Certain antimony derivatives, such as the pentavalent diethylamine-aminophenyl-stibonate (neostibosan) administered intravenously bring about a rapid cure. Generally an injection of 10 centigrams followed by one of 20 centigrams and then five of 30 centigrams, the injections being given twice a week, are enough to bring about healing of the sore in a short time. *C. M. W.*

FLARER (Franco). Nuovo metodo di cura per la leismaniosi cutanea (bottoni d'Oriente). [**New Cure for Oriental Sore.**]—*Boll. Istituto Sieroterap. Milanese.* 1938. Aug. Vol. 18. No. 8. pp. 469–473. German summary (10 lines).

The author states that solution of atebrin injected into the skin round oriental sores rapidly destroys the parasites and cures the disease. The dose administered at one sitting commences at 0·05 to 0·1 gram dissolved in 1 or 2 cc. of distilled water and is increased at subsequent sittings to 0·3 gram. In some cases only a single injection was required to bring about a cure, which has been effected in 14 cases. *C. M. W.*

CASTELLANI (Aldo) & AMALFITANO (G.). **Treatment of Oriental Sore (Leishmaniasis Cutanea) with Fuchsin Paint.**—*Jl. Trop. Med. & Hyg.* 1939. Feb. 1. Vol. 42. No. 3. pp. 33–34. With 2 figs.

The authors have treated three cases of oriental sore with a fuchsin paint prepared as follows. Saturated alcoholic solution of basic

fuchsin 10 ml., 5 per cent. phenol solution 100 ml. ; filter and add boric acid 1 gram and two hours later acetone 5 ml., two hours later resorcinol, 10 grams, is added. The mixture is kept in a dark-coloured stoppered bottle. The sore is cleared of scab and scales by moist dressing of boric acid and resorcinol applied for two days. The fuchsin paint is then applied twice daily to the sore, while " 2 c.c. of the same solution is given intramuscularly every other day. The solution may also be injected into the nodule or around it." Presumably the solution referred to is the paint itself but whether this is so is not quite clear. Three cases, all from Africa, were treated, the sores healing in two to three and a half months. *C. M. W.*

Reyes Oribe (Hector). Leishmaniosis tegumentaria americana. Modificaciones en el tratamiento : asociación Yatrén-Fuadina. (Tratamiento Mazza.) [**Yatren-Fouadin Treatment of S. American Cutaneous Leishmaniasis.**]—*Prensa Méd. Argentina.* 1938. Dec. 28. Vol. 25. No. 52. pp. 2465–2475. With 6 figs. English summary.

In this article the author discusses a number of remedies which have been employed for the treatment of muco-cutaneous leishmaniasis in S. America. These have not given very satisfactory results and he himself has been disappointed in the therapeutic effect of various antimonials. Accordingly, on Professor Mazza's suggestion, he combined treatment with large doses of fouadin with intravenous injections of yatren. This was administered in a daily dose of 2 cc. of a 3 per cent. solution till 40 to 60 cc. had been given. The results of this combined treatment are described as being excellent. *C. M. W.*

TROPICAL OPHTHALMOLOGY.

A Review of Recent Articles. XXXI.*

Conjunctiva.—The nature of the epidemic of ophthalmia which raged in Europe during the Napoleonic campaign and after the return of the French and British troops from Egypt has always offered material for discussion. Law[1], after a comprehensive review of the literature, concludes that, though trachoma was well known in Western Europe before the Egyptian campaign, yet a consideration of the history of the disease suggests that much of the subsequent infection was brought from Egypt. The troops were also heavily infected with gonorrhoeal ophthalmia. [The description of the epidemic by Larrey, Napoleon's surgeon-in-chief, quoted by the author, points to the existence of diverse causes—keratomalacia being one of them.]

Spring Catarrh.—Lyons[2] has made a careful study of vernal catarrh in Egypt. The essential feature of the disease is an intermittent

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* For the 30th of this series see Vol. 35, pp. 855–857.

[1] Law (Frank W.). " Egyptian Ophthalmia."—*Brit. Jl. Ophthalm.* 1939. Feb. Vol. 23. No. 2. pp. 81–95. [11 refs.]

[2] Lyons (F. Maxwell). The Biomicroscopy of Spring Catarrh.—*Twelfth Ann. Rep. Memorial Ophthalmic Laboratory Giza, Cairo. 1937.* Appendix No. 2. pp. 1–13. With 6 coloured plates & 4 figs. [12 refs.]

exudation of fibrin and wandering cells from certain groups of the conjunctival capillaries. This exudation may occur from the new formed vessels in trachomatous pannus as well as from the normal subconjunctival capillaries. It is likely to be best marked in areas where there is little mechanical resistance to leakage as in the interpalpebral portion of the bulbar conjunctiva. The tarsal conjunctiva, being firmly bound by fibrous bands to the tarsal plate, is unable to accommodate the exudation, which consequently exudes through the epithelium and forms a sticky film on the surface. The epithelial layer soon becomes uprooted at the points of its weakest attachment and is ballooned out into broad papillae which undergo vascularization. The author minutely describes the corneal changes induced by exudation from the vessels of the limbus and of any existing trachomatous pannus. Early symptoms of the disease are: (1) a general sallow appearance; (2) a sensation as if something was crawling beneath the lid; (3) a brilliant surface sheen of the conjunctiva with an opalescence of the tissues; (4) a local eosinophilia combined with a tacky fibrinous discharge.

Purulent Ophthalmia.—FERNÁNDEZ[3] has reported strikingly successful results in eight cases of gonorrhoeal ophthalmia from the use of sulphanilamide, 2·6 gm. of the drug was administered daily for the first three days in four evenly-spaced doses of 0·65 gm. On the fourth day one dose was omitted so that the total amount on that day was 1·95 gm. The last two patients received no local treatment and were treated with sulphanilamide exclusively, yet they recovered just as rapidly as the others.

Trachoma.—Events during the past twenty years have led to a considerable increase in the incidence of trachoma in Greece; in some localities this is as high as fifty per cent. according to COSMETATOS and CHARAMIS[4]. These authorities review the measures taken and to be taken to control the disease. A special trachoma section of the Ministry of Health and Public Assistance was instituted ten years ago; this works in cooperation with the departments of Education, War and Admiralty. The school index method will mostly be employed to detect foci of infection and the campaign will then be organized on a sound basis. About one hundred dispensaries will be provided for treatment and the staff for these will be trained in four or five centres established in the large towns. Special provision for trachoma patients will be made in the General Hospitals and in the various industrial factories throughout the country. A 100-bed Home is proposed for trachomatous orphans and special companies in regiments will be instituted for trachomatous soldiers. The programme will take eight years and will cost about twenty million drachmae. The Greek Red Cross Society started a trachoma dispensary in 1925 in the heavily infected district of Laurium, and in 1931 opened a model hospital in Athens under the direction of Dr. J. S. CHARAMIS. CORNET[5] contests the claim made by KELLER that a close connexion

[3] FERNÁNDEZ (Luis J.) & FERNÁNDEZ (Ricardo F.). Sulfanilamide in Gonorrheal Ophthalmia. Preliminary Report.—*Amer. Jl. Ophthalm.* 1938. July. Vol. 21. No. 7. pp. 763–766. With 1 fig.

[4] COSMETATOS (G. F.) & CHARAMIS (Jean S.). La lutte contre le trachome en Grèce.—*Rev. Internat. du Trachome.* 1938. Oct. Vol. 15. No. 4. pp. 149–164. With 6 figs.

[5] CORNET (Emmanuel). A propos de symptomes du trachome décrits par Keller en 1937.—*Rev. Internat. du Trachome.* 1938. Oct. Vol. 15. No. 4. pp. 165-179. [19 refs.]

exists between trachoma and syphilis. He considers that though the diseases more or less often may be associated yet they are not necessarily so. Trachomatous pannus certainly exists and it cannot be mistaken for interstitial keratitis. Should an individual suffer from both syphilis and trachoma, general treatment will act on the syphilis and the trachoma will be ameliorated. The follicle in trachoma differs from that in folliculosis in that it yields to crushing and leaves a cicatrix; this is claimed to be a pathognomonic characteristic. The dissemination of the disease in the French Colonies is described by MARQUE[6] who states that it is almost unknown in the small colonies and is rarely seen in Madagascar. It is, however, very common in Indo-China and most prevalent in the African Colonies. The author describes the disease and the organization necessary for its suppression. Much of the latter, however, involves greater expense than the colonies can afford and attention should in the first place be directed to improvement of rural hygiene, propaganda, and education of the local practitioner in dealing with trachoma.

JULIANELLE, SORY, SMITH and LANGE[7] have experimented with tartar emetic in the treatment of trachoma and have described their technique and results. The character of the latter leads them to conclude that the drug may possibly be of some use in certain varieties of the disease. The benefit seemed to be most marked in cases with corneal complications and in those which had been subjected to graftage.

As might be expected sulphanilamide has been fairly extensively tried in the treatment of trachoma. KIRK, MCKELVIE & HUSSEIN[8] report favourable results in the Sudan and found it particularly beneficial when corneal complications were present. They state that "compared with present methods of treatment sulphanilamide therapy is simpler and much less painful, but its permanent effectiveness has still to be ascertained." LOE[9] has used the drug in the case of 140 patients and says that his experience has made him extremely sanguine. GRADLE[10] has also had good results in 41 patients and thinks it may prove a new means of combating the more acute stages. He states that the drug is not free from danger and should only be employed when medical observation every twenty-four to forty-eight hours is possible.

Cataract.—The influence of general nutrition in the causation of cataract has been discussed by YUDKIN[11]. He concludes that the disease is unlikely to be due to any single factor, but is produced by many conditions, a disturbance of the general metabolism being one of the most important. The prescription of a well-balanced diet properly supplemented with vitamins must play an important part in the prevention and treatment of the disease.

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[6] MARQUE. Le trachome dans les colonies françaises.—*Les Grandes Endémies Tropicales.* 1938. Vol. 10. pp. 98–114.

[7] JULIANELLE (L. A.), SORY (R.), SMITH (J. E.) & LANGE (A. C.). The Effect of Tartar Emetic on the Course of Trachoma. A Preliminary Report.—*Amer. Jl. Ophthalm.* 1938. June. Vol. 21. No. 6. pp. 651–657.

[8] KIRK (R.), MCKELVIE (A. R.) & HUSSEIN (Hussein Ahmed). Sulphanilamide in the Treatment of Trachoma.—*Lancet.* 1938. Oct. 29. pp. 994–995.

[9] LOE (Fred). Sulfanilamide Treatment of Trachoma. Preliminary Report.—*Jl. Amer. Med. Assoc.* 1938. Oct. 8. Vol. 111. No. 15. pp. 1371–1372.

[10] GRADLE (Harry S.). [Discussion of above paper.]—*Jl. Amer. Med. Assoc.* 1938. Oct. 8. Vol. 111. No. 15. p. 1372.

[11] YUDKIN (Arthur M.). Diet and Vitamins in Relation to Cataract.—*Amer. Jl. Ophthalm.* 1938. Aug. Vol. 21. No. 8. pp. 871–881. [14 refs.]

The Twelfth Annual Report of the Memorial Ophthalmic Laboratory at Giza for the year 1937 contains much informative matter attractively presented. The publication has always maintained a very high standard. The activities of the Institution include post-graduate teaching, routine laboratory work, clinical work and research. Cases from the hospitals and the country districts on which a consultation is required are referred to the Institute and many of the more interesting are described, one of them being a neuro-retinitis due to bilharzial infection. In his remarks on the clinical work the Director, R. P. WILSON, states that trachoma in Egypt is not the acute and serious disease that it is in America and Northern Europe, its natural tendency being towards spontaneous cure by early cicatrization, but secondary infections delay cicatrization and often produce grave lesions. Prontosil was found to be useless in treating the disease. Research on trachoma was carried out by F. H. STEWART during the year and particulars are included in the appendix. He concluded that trachoma virus passes all filtering membranes with an a.p.d. above 0·75 and its size is slightly less than that of *B. prodigiosus*. The disease is spread by direct contact and is not carried by lice or by flies. An account of research by F. Maxwell LYONS on spring catarrh has already been referred to in this article.

The report of the Madras Government Ophthalmic Hospital is now triennial and that for the years 1935–1937 is confined to statistics and omits the clinical reports which were an important feature of previous issues. The size of the Institution and the amount of work done is evidenced by the number of admissions. In-patients ranged between 4,391 in 1936 and 4,784 in 1937, and out-patients between 31,609 in 1936 and 33,660 in 1935. Conjunctival and corneal complaints account for the majority of the out-patient admissions, whilst 2,332 senile cataract patients were admitted to the hospital in 1937. 2,163 of these were operated upon, 1,924 by combined extraction with capsulotomy, 239 by intra-capsular extraction and iridectomy, and eight by simple capsulotomy. 216 sclero-corneal trephinings were performed and 364 lachrymal sacs were excised. *H. Kirkpatrick.*

THE TYPHUS GROUP OF FEVERS.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

LECCISOTTI (p. 461) shows that about half of a series of 93 rats caught in Taranto gave positive Weil-Felix reactions, and points out the epidemiological importance of this finding.

BLEWITT (p. 461) reviewing the history of typhus in the Kumaun hills, and in view of the negative results he obtained on attempting to infect animals by injecting crushed ticks, considers that the disease, which is endemic, is probably louse-borne.

LEWTHWAITE (p. 463) in reporting transmission and immunity experiments with the virus of shop typhus obtained from rats in Kuala Lumpur, shows that an apparent mutation of one strain from the *X19* to the *XK* type took place. A possible explanation is that both types were present in the original blood of the rats. No protection against local strains could be obtained by using Weigl and other

vaccines. RAYNAL (p. 464) found that virus isolated from human cases of typhus in an epidemic in Shanghai was apparently identical with virus isolated from rats in the houses of patients, and was therefore probably that of murine typhus.

BLANC *et al.* (p. 464) proved that infection could be conveyed to man by placing dried flea excreta on mucous membranes. Dried excreta of lice or fleas may retain virulence for 12 months and infection may thus be carried over from one epidemic season to another. Louse-borne infection, by dried excreta, may occur by the oral route. STARZYK (p. 464) also proved that dried excreta of lice, and other material at laboratory temperature was infective after 58 days, and longer at +5°C. Drying is therefore a simple way of maintaining the virus and in nature is of vital epidemiological importance. LE CHUITON and PENNANÉAC'H (p. 465) failed to infect guineapigs by inhalation of an emulsion of murine typhus virus. Infection by the respiratory route can therefore only be exceptional.

PHILIP and PARKER (p. 466) found that the virus of endemic typhus could be isolated from the brains of rats up to 370 days, but that of Rocky Mountain fever and boutonneuse fever could not be recovered after 30 days. BOISSEAU (p. 466) found that when infected guineapig testis and tunica is kept in glycerine saline at 0°C. it is infective for 11 days, and longer at lower temperatures. HITZ (p. 466) modifies recognized methods of culture of *R. prowazeki* by the introduction of human ascites fluid into the medium. He considers that the Rickettsia should be regarded as more akin to bacteria (especially the *Haemophilus* group) than to viruses.

VIOLLE (p. 467) isolated a virus from patients with murine typhus on a ship in Toulon. He succeeded in infecting various animals by feeding them on infected material. The virus was readily destroyed by dilute disinfectants. WOHLRAB (p. 467) describes the infection of 1,000 white mice with the virus of murine typhus.

LAIGRET and AUBURTIN (p. 468) prefer rapid staining with a thionine stain to Giemsa in the demonstration of Rickettsia.

LIU *et al.* (p. 468) found that the sera of 37 of 121 doctors and nurses inoculated with louse vaccine subsequently gave negative reactions to Rickettsia emulsions, and 16 negative reactions with *Proteus*. PIJPER and CROCKER (p. 468) discuss the serological reactions of (1) tick bite fever, (2) epidemic typhus (presumably louse-borne) and (3) murine typhus in South Africa. The virus of (2) protects against (1) and (3), that of (3) against (1), but that of (1) does not protect against the other two. MATHEW (p. 469) describes the urban typhus, in which the serum agglutinates *Proteus X19*, and scrub typhus, agglutinating *Proteus OXK* and probably mite borne, in Queensland.

BOTZARIS (p. 470) details the changes in the blood counts during infection of guineapigs with the virus of endemic typhus. PETZETAKIS (p. 470) describes endemic murine typhus in man and rats in Athens. RÍSQUEZ *et al.* (p. 470) record patients with exanthematic typhus in Venezuela.

GOHAR (p. 471) uses carbolized emulsion of brains of infected guineapigs in prophylaxis against typhus. SCHWEICKHARDT (p. 471) obtained protection against the Mexican type of typhus by vaccines prepared according to Zinsser's method, and found that treatment with antisera obtained from infected horses produced favourable results. BLANC and BALTAZARD (p. 471) use the dried faeces of *X. cheopis* which have been fed on infected rats, for the preparation of

vaccines. Good results are obtained and the virus in the dried faeces remains active for as long as one year.

JORDAN and FLETCHER (p. 472) note that if 4 per cent. of ammonia is added to a local cresylic disinfectant it destroys lice and eggs in one hour.

ZIA and LIU (p. 472) point out the dissimilarity between the agglutinin production for Rickettsia and the Weil-Felix reaction in *Myospalax fontanieri* infected with typhus virus.

PIÉRI (p. 472) reviews the history of boutonneuse fever. OLMER and OLMER (p. 473) consider that although the virus of boutonneuse fever is most closely allied to that of Rocky Mountain fever (and less so to the others of the typhus group) it is distinct. BOISSEAU (p. 473) inoculated himself with the virus of boutonneuse fever and describes the course of the local lesion and general disease.

GIBBONS (p. 474) shows that Rocky Mountain fever has been endemic in Western Canada since 1917, but no evidence of infection was found in 30,000 ticks collected.

PILCHER (p. 474) records cases of Rocky Mountain fever in Massachusetts. FLIPPIN (p. 474) discusses typhus in Pennsylvania. JORDAN (p. 475) notes that 32 of 38 cases of Rocky Mountain fever reported in Iowa occurred in rural areas and most were associated with dogs heavily infested with *D. variabilis*. This tick was proved to harbour the virus in certain localities. BISHOPP and SMITH (p. 475) describe the bionomics of *D. variabilis*, the principal, if not the only vector of Rocky Mountain fever, and a vector of other diseases. Low relative humidity is probably the most important limiting factor. Various mammals may be infested, but the dog is the main host. Methods of control are given. The abstract cannot be summarized further.

BRIGHAM (p. 477) shows that endemic typhus virus can be maintained in the numerous native field mice of Alabama, and (p. 477) details a number of wild rodents susceptible to endemic typhus virus in the same area. DAVIS and PARKER (p. 477) found that cross immunity tests of two strains of virus of Rocky Mountain fever, of two different serological types in man, failed to show immunological differences in rabbits.

DIAS (p. 477) uses the term Brazilian spotted fever for the endemic typhus of São Paulo and Minas Geraes. The serological reactions and the fact that it is transmitted by ticks of the Amblyomma genus show the similarity to Rocky Mountain and boutonneuse fevers. TRAVASSOS (p. 478) shows that dogs may form a reservoir of endemic typhus and that this is transmissible by *Amblyomma striatum* in São Paulo. DE MAGALHÃES (p. 478) succeeded in infecting guineapigs with typhus by naturally infected *Amblyomma cajennense* in Minas Geraes, and (p. 478) describes the pathological appearances found in man.

GUNTHER (p. 478) considers that the vector of the endemic typhus of New Guinea (which resembles tsutsugamushi fever clinically and serologically) is a mite, either a rare species or a rarely infected common species. HEINEMANN (p. 479) reports three cases of a second infection with pseudotyphus in the Dutch East Indies. The intervals between infections were from 1 to 2½ years, and little, if any, immunity is developed.

DAVIS *et al.* (p. 479) discovered infection with a new virus, probably similar to that of Q fever of Australia, in specimens of *D. andersoni*

in Montana. The virus passes Berkefeld N and W filters, but not a Seitz disc. Various rodents could be infected, but no protection was given against Rocky Mountain virus. Transmission by nymphs and adult ticks developed from infected larvae was proved and eggs of infected adults developed to infective larvae. Rickettsia-like bodies were constantly found, but were very slender and resembled *Bartonella bacilliformis*. The virus is cultivable in tissue culture. There is no cross immunity with Rocky Mountain fever.

ARCHER (p. 481) isolated *Proteus muar* from a laboratory mouse.

C. W.

LECCISOTTI (G.). La "Weil-Felix" nella popolazione murina di Taranto. [**The Weil-Felix Reaction in the Rats of Taranto.**]—*Pathologica*. 1938. Dec. 15. Vol. 30. No. 566. pp. 522–524. English summary (3 lines).

The author tested the serum of 93 rats (55 *Mus decumanus*, 35 *Mus rattus* and 3 *Mus musculus*) caught in Taranto. Three strains of *Proteus* were used, *Felix*, *Siriaco* and *Metz*. Forty-seven sera (39 *decumanus* and 8 *rattus*) were positive to a dilution of 1 in 100.

The author points out that these rats act as reservoirs and may transmit to man, by their fleas, mild endemic typhus of the nature of Brill's disease. But since according to certain workers the virus of murine typhus may give rise to classical human typhus, the importance of this rat reservoir in a Mediterranean port is obvious. *C. W.*

BLEWITT (Basil). **Fevers of the Typhus Group in the Bhim Tal Area, Kumaun Hills, U.P., India. Being a Report of an Investigation carried out into the Alleged Incidence and Nature of Typhus Group Fevers in the Bhim Tal Area, Kumaun Hills, July, 1936.**—*Jl. Roy. Army Med. Corps*. 1938. Mar., Apr., May & June. Vol. 70. Nos. 3, 4, 5 & 6. pp. 157–167; 241–245; 312–315; 379–387. With 1 map & 6 charts. [30 refs.]

The Kumaun Hills lie between the Terai foot-hills and the main range of the Himalayas at an altitude of 4,000 to 8,000 feet with numerous deep valleys and, in the locality under discussion, a series of small lakes; three of these lakes, Bhim Tal, Sat Tal and Naukuchhiya Tal, lie in the Bhim Tal valley about nine miles from Naini Tal, the Headquarters of the Eastern Command. This valley is about five miles in length by two in breadth and runs in a south-easterly direction through the hills. Along this valley runs one of the main trade routes from the plains to the hills and on to Tibet. There is much traffic along this road, especially in the summer months. The majority of the local inhabitants are also nomadic and spend the summer in the hills and the winter in the plains.

Bhim Tal village is situated at the top of the lake on ground which is marshy in the rains but in the summer is covered with grass and scrub. During the hot weather the palace here has been occupied for the last 15 years by the Maharajah of Jind who brings with him annually about 500 people, guests, officials and servants and many dogs; all these return to the plains in the cold weather. The Rajah and his household spend most of their time shooting in the valley and

surrounding hills, but so far no cases of typhus have been reported among them. At Sat Tal the principal house and bungalows are in the possession of an American Mission and missionaries from the plains come up here in the hot weather for short periods of leave and to convalesce after illness. During the last six years no cases of typhus have occurred among the people.

So long ago as 1913 typhus was reported in the Bhim Tal area, Captain McKechnie, I.M.S. [unpublished report] investigated the outbreak in that year and came to the conclusion that the cases, 32 in all, were of true louse-borne typhus. Further sporadic cases have been reported from time to time in the same area. In 1916 Major (now Sir John) Megaw [this *Bulletin*, 1917, Vol. 9, p. 489] was camping in the Bhim Tal valley and contracted typhus fever and was of opinion that the vector, in his case, was a tick ; in 1926 one fatal case of typhus was reported, in 1932 four cases, two of which were fatal, and in 1936 two further cases. All these were Europeans, visitors to the district and mostly officers on leave who had spent much of their time in the scrub and jungle around the lakes.

The author of the present paper, who was stationed at Bareilly in the United Provinces, decided to investigate the question of typhus from the point of view of the vector. A field laboratory was established at Bhim Tal during the summer of 1936 ; a system of extended drives on a frontage of one-quarter of a mile was carried out from one end of the area to the other.

Three methods of collection were employed :—

1. Removal and collection of ticks from all animals, cattle, etc., met with during the course of the drive ;

2. Dragging the area with cloths and flags for collection of " seed " ticks ;

3. Removal of ticks from dogs and from coolies employed in carrying out the drives. Some thousands of ticks were collected in this way and about 1,000 were examined ; 60 per cent. of these were *R. sanguineus* and *Hyalomma aegyptum*. These ticks were crushed in a mortar and emulsified and injected intraperitoneally into guinea-pigs, rabbits and white rats. Some of the ticks were also fed on rabbits and guineapigs, then crushed and injected into experimental animals. Twenty-six animals only were used ; owing to the difficulty of obtaining experimental animals no more were available ; 814 ticks were fed and injected.

In one or two of the animals there was a slight febrile reaction but no definite typhus infection and in none of the rabbits or rats was there any positive Weil-Felix reaction. There is, therefore, no indication from this work that infected ticks are numerous in and around Bhim Tal if they do exist.

The author is inclined to agree with McKechnie that the outbreak in 1913 was due to louse-borne infection and he also considers that the subsequent cases may be explained in the same way—susceptible people coming into close contact with natives carrying infected lice. He explains the occurrence of the disease in the Bhim Tal valley as being due to imported infection along the trade route which passes through the valley ; the camps and villages in the valley being the first stopping place on the road from the plains to the hills. His conclusions are that true louse-borne typhus is endemic in the Kumaun hills and that the geographical position of Bhim Tal on the main road to and from Almora and Tibet explains the occurrence of the disease

in that valley and so far as his work went there was no evidence to support the theory that the cases which had occurred in and around Bhim Tal were due to the bites of infected ticks. *D. Harvey.*

FEDERATED MALAY STATES. ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1937 [KINGSBURY (A. Neave), Director]. [**Typhus-like Fevers.** pp. 106–120. LEWTHWAITE (R.).]

Wild rats were trapped in the town of Kuala Lumpur and from these two strains of the virus of endemic typhus (shop typhus) were obtained by inoculation into guineapigs which had been fed on a deficiency diet. Fever, enlarged spleen, and scrotal swelling without necrosis were noted in these animals; Rickettsia were seen in stained smears from the tunica vaginalis. This virus when injected into the eyes of rabbits caused a modified reaction which died out after the 3rd or 4th passage; this is similar to the results obtained with the virus from cases of the disease, and differs from the marked reaction which follows injection of the virus of tsutsugamushi fever (scrub typhus). The Weil-Felix reaction was positive for *Proteus X19* up to a dilution of 1/1500. Rats were readily infected, these developed high fever with high mortality. There was complete cross immunity between these two strains obtained from the rats and a virus previously isolated from a local case of endemic or urban typhus fever. Wild rats were caught in a plantation on which numerous cases of tsutsugamushi fever had occurred but only a few cases of endemic typhus. The brains of four of these rats were pooled and emulsified and this emulsion was inoculated into guineapigs and a strain of virus of endemic typhus was obtained. This strain when inoculated into the eye of rabbits gave the reaction of murine typhus, yet the curious fact was noted that of 13 rabbits infected, six gave a positive Weil-Felix reaction with *Proteus X19* while two agglutinated *Proteus OXK* and nine were negative. This strain gave complete cross immunity with the strain isolated from the town rats and also with the human strain; but the results with a virus of tsutsugamushi fever were indefinite. Cross infection in the eyes of rabbits with this strain and a strain of tsutsugamushi fever were obtained; for instance, one eye of a rabbit was inoculated with virus E endemic typhus, a modified reaction followed and a positive Weil-Felix reaction for *Proteus OXK*, yet on inoculation of the virus of tsutsugamushi fever into the sound eye a maximum reaction followed. This virus (*X19*) isolated from the plantation rats was utilized in transmission experiments with the rat flea and guineapigs; from one of the guineapigs utilized a definite *OXK* or tsutsugamushi fever virus was obtained. An apparent mutation of the rat strain E took place from *X19* type of virus to *XK* type. This point is being further investigated. It is suggested that when the four original rats were pooled both viruses may have been isolated. Some 1,000 mites were taken from the captured rats and examined but no virus was isolated although some of these mites were actually taken from the four rats from which strain E was isolated.

Some Weigl lice vaccine was obtained from Europe and tested against the local strains of virus but no protection could be demonstrated. Some other vaccines were also tested by ageing of virus, drying virus and coating with yolk of egg on oil and lanolin but without success. *D. H.*

RAYNAL (J.). Sur le typhus exanthématique de Changhai (concession française). [**On Typhus in Shanghai.**]—*Bull. Soc. Path. Exot.* 1938. July 6. Vol. 31. No. 7. pp. 662–669.

The author refers to a previous note on the same subject [see this *Bulletin*, 1938, Vol. 35, p. 781]. Since the publication of this note three new facts have emerged: (1) an epidemic has been observed in the month of March 1938; (2) the virus has been isolated from two of the cases; (3) a virus has also been isolated from rats caught in houses of patients.

In 1937 enormous numbers of refugees poured into Shanghai and the French concession was overcrowded. Cases began to appear in February and increased in March and April. Although these cases were severe the mortality was low, 10 per cent., and the disease did not spread. The virus which was isolated from the cases produced fever and orchitis in guineapigs and was apparently identical with the virus isolated from the rats. The cases were therefore probably murine typhus. *D. H.*

BLANC (Georges) & BALTAZARD (M.) with the collaboration of A. DONNADIEU. La contamination par voie muqueuse, mécanisme habituel de transmission du typhus murin dans la nature. Rôle du virus sec des déjections d'ectoparasites dans l'épidémiologie des typhus. [**Infection through the Mucous Membranes is the Usual Method of Transmission of Murine Typhus in Nature. The Rôle of the Dried Excreta of Ectoparasites in the Epidemiology of Typhus.**]—*Bull. Acad. Méd.* 1938. July 26. 102nd Year. 3rd Ser. Vol. 120. No. 27. pp. 109–114. With 2 charts. [22 refs.]

Forty mgm. of dried flea excreta, which had been kept for four months was dissolved in a small quantity of water and given to two men to drink. Twenty mgm. of dried excreta was placed on the nasal mucous membrane of two other men, and in two others 5 mgm. was placed on the conjunctivae. Of these six men, one who had been inoculated by the nasal route developed fever, there was no reaction in the five others. However, when these five were tested 65 days later by injection of living virus, three were found to be immune. It would appear, therefore, that at least four of the six men experimented on had been infected.

The authors have found that the dried excreta of infected lice or fleas may retain virulence for at least 12 months; in this way it is possible that infection may be carried over from one epidemic season to another without any actual cases occurring in the non-epidemic period. They suggest that louse-borne typhus infection may also be by the oral route with dried lice excreta.

During the course of their investigation they came across one mendicant from whose person and clothing they collected no fewer than 20,000 lice and "a mass" of dried excreta. *D. H.*

STARZYK (Jean). Vitalité, virulence et pouvoir immunisant de *Rickettsia provazeki*, conservés en dehors de l'organisme du pou. [**The Vitality, Virulence and Immunizing Power of** *Rickettsia prowazeki* **maintained outside the Organism of the Louse.**]—*Arch. Inst. Pasteur de Tunis.* 1938. Sept. Vol. 27. No. 3. pp. 263–281. With 12 figs.

In the first series of experiments emulsions of the intestines of infected lice were made in the following liquid media, human serum,

guineapig serum, horse serum and in normal saline solution. These were kept at laboratory temperature and tested by inoculation into lice by the intestinal route. It was found that the best medium for the preservation of the virus was human serum; lice could be infected up to six days; the percentage of "red lice", that is lice with maximum infection, was also greater in those injected with the emulsion in human serum.

In the second series of experiments dried material was utilized:

1. Intestines of infected lice removed and dried in vacuo.
2. Lice excreta dried similarly.
3. Whole infected lice, dried and kept at laboratory temperature or at +5°C.

At laboratory temperature the virus was still infective after 30 days in the whole lice, after 58 days in the excreta and after 60 days in the intestines.

When the dried materials were kept at +5°C. the following results were obtained:

Dried excreta, still infective, 4½ months.
Dried intestines, still infective, 6 months.
Dried lice, still infective, 3 months.
[These figures are taken from an *erratum* published subsequently.]

All these were proved by injection into normal lice and the subsequent emulsifying of these lice and injection into guineapigs which became infected.

The author points out that this is a simple way of maintaining the virus in the laboratory and also of sending the virus to other places. From the epidemiological standpoint it is of vital importance as it shows that infection may be carried not only by living but by dead lice or the dried excreta of lice and also explains how infection may be carried by or on the clothes of infected persons even after many months.

[It is interesting to note that recently attention has been called to the risk of infection from dried excreta of lice in the paper by Blanc above and the present paper. The British Trench Fever Commission, under the Chairmanship of Sir David Bruce and of which Professors Bacot and Arkwright were members, insisted more than 20 years ago on the importance of this method of infection.] *D. H.*

Le Chuiton (F.) & Pennanéac'h (J.). Essais de transmission du typhus murin au cobaye par la voie respiratoire. [**Attempts to transmit Murine Typhus to the Guineapig by the Respiratory Route.**]—*Bull. Soc. Path. Exot.* 1938. July 6. Vol. 31. No. 7. pp. 559–561.

The strain of virus used was that of Toulon murine typhus (ship typhus). An emulsion of the brain of infected guineapigs was injected directly into the lungs of two normal animals. Both developed fever and were immune when tested later. The same inoculum was injected directly into the trachea, no fever resulted but the animals were found to be immune later. It is possible that in making these injections small wounds may have been made and the infection resulted from absorption of virus through these lesions. Accordingly guineapigs were

placed in a glass vessel and sprayed with the infective emulsion but no infection resulted nor was immunity produced.

The conclusion reached is that the respiratory route of infection can be only exceptional. [Possibly if dried excreta of infected fleas had been used the results would have been different.] *D. H.*

PHILIP (Cornelius B.) & PARKER (R. R.). **The Persistence of the Viruses of Endemic (Murine) Typhus, Rocky Mountain Spotted Fever, and Boutonneuse Fever in Tissues of Experimental Animals.** —*Public Health Rep.* 1938. July 22. Vol. 53. No. 29. pp. 1246–1251.

Rats, ground squirrels and mice were used in this research.

From rats infected with the endemic typhus virus the virus could be isolated from the brain up to 370 days and from the spleen up to 153 days. In 30 days the infection had disappeared from the tunica.

In mice the virus could still be recovered after 150 days from the brain and 130 days from the spleen. In squirrels the virus could not be recovered after 30 days from brain or spleen. With the virus of Rocky Mountain fever and boutonneuse fever neither mice, rats nor guineapigs showed any infection after 30 days. *D. H.*

i. BOISSEAU (R.). Technique simple et économique de conservation et d'entretien du virus de la fièvre boutonneuse. [**A Simple Technique for the Maintenance of the Virus of Boutonneuse Fever.**] —*Bull. Soc. Path. Exot.* 1938. Nov. 9. Vol. 31. No. 9. pp. 791–794.

ii. ——. Transport à distance du virus de la fièvre boutonneuse conservé *in vitro*. [**Transport to a Distance of the Virus of Boutonneuse Fever in Vitro.**]—*Ibid.* pp. 794–796.

i. The entire testicle with the adherent tunica is removed from an infected guineapig and immediately placed in a test tube containing a solution of two parts glycerine and one part normal saline. In this solution the virus remains active for 1 day at room temperature and if kept at 0°C. for 11 days and at —10°C. for at least 40 days.

ii. The test tube containing the testicle can be placed in a metal case cooled to —10°C. then the case can be packed in ice in a flask and sent to a distance by air and then utilized for injection of animals, etc. This has been successfully accomplished by the author.

D. H.

HITZ (Siegfried). Cultivo de la *Rickettsia prowazeki* in vitro. [**Cultivation of** *Rickettsia prowazeki in vitro.*]—*An. Escuela Nac. Ciencias Biol.* Mexico. 1938. Oct.–Nov.–Dec. Vol. 1. No. 1. pp. 7–28. With 5 figs. on 4 plates. [45 refs.] English summary.

"The present report describes, after some short considerations about the relations among the different typhus fever strains, followed by a short historical introduction, a method to cultivate Rickettsia prowazeki in vitro based on the classical one of Maitland and Maitland, adopted to the culture of Rickettsia by Nigg and Landsteiner. We have introduced some modifications to this method, as the substitution of Erlenmeyer flasks by test tubes and Tyrode's solution by human ascites. With this method we obtained satisfactory results, comparable to those obtained with the original method. The strain was cultivated throughout more than 20

generations, having observed a growth curve similar to that of bacteria, in the series of cultures in which the number of rickettsiae was determined daily. The virulence of the cultures was proved by inoculation into guinea-pigs, which developed the symptomatology of typhus fever, immunity to reinoculation and showed rickettsiae in the tunica vaginalis. The morphological study of the cultures colored by methods extensively described, shows the form of propagation of the germs, their exclusively intracellular position and a possible invasion of elements of the connective tissue of the muscles.

"Judging premature the attempt to cultivate the Rickettsia prowazeki in cell free media, the author expresses the hope that a detailed study of the factors prevailing in Maitland cultures will solve the question. The germ of typhus fever should be considered more closely related to the bacteria than to the filtrable virus, especially to those of the haemophilus group, which need for their growth certain substances produced by cells."

VIOLLE (H.). Expérimentation sur le typhus exanthématique murin. [**Experiments with the Virus of Murine Typhus.**]—*Marseille-Méd.* 1938. July 5–15. Vol. 75. No. 19–20. pp. 29–36.

Three types of fever of the typhus group are met with in the south of France :—

1. A few imported cases of true louse-borne typhus ; these do not spread.
2. Murine typhus on board ships in Toulon harbour.
3. Boutonneuse fever.

The author obtained blood from cases of fever on a ship in Toulon harbour and inoculated this into rats and guineapigs, a virus was isolated and passaged, it was found that in white rats the virulence of the virus was much enhanced by passage and especially in rats fed on a deficient diet. Guineapigs had only a mild febrile reaction with peri-orchitis. In rabbits and puppies there was no fever but the virus could be recovered from these animals up to five months in the rabbits and three months in young dogs.

Pigs also could be infected and showed a very definite rash, in these animals also the infection was inapparent but the virus could be recovered up to three months. All these animals could be infected readily by feeding them on infected material such as brain of guineapigs or urine of white rats.

Blood taken from patients during the fever and allowed to clot, then mixed with bread and fed to rats infected these animals.

Rats and guineapigs could also be readily infected by intradermal injection of small quantities of infective material in a fine needle. The virus was readily destroyed by carbolic acid and other diluted disinfectants. *D. H.*

WOHLRAB (R.). Die experimentelle Infektion weisser Mäuse mit murinem Fleckfiebervirus. [**Experimental Infection of White Mice with the Virus of Murine Typhus.**]—*Zent. f. Bakt.* I. Abt. Orig. 1937. Vol. 140. No. 3/8. Beiheft pp. 193*–201*. With 9 figs.

Some 1,000 animals were used and they were found to be readily infected by the peritoneal route. Brain emulsion was used as the infective material in doses of 0·25 cmm. in 1/50,000 dilution. Of 100 animals which received doses in 1/8,000 dilution, 65 died, 10 were severely ill, 18 were ill and 7 showed no reaction. The clinical and

post-mortem results are detailed and excellent photographs are reproduced showing Rickettsia in enormous numbers in the peritoneal fluid. The strains of murine typhus used were Mexican and Tunis No. 1.

D. H.

LAIGRET (J.) & AUBURTIN (P.). Coloration rapide des rickettsias par la thionine. [**Rapid Staining of Rickettsia with Thionine.**]—*Bull. Soc. Path. Exot.* 1938. Nov. 9. Vol. 31. No. 9. pp. 790–791.

The thionine is prepared as follows : Dissolve the powder to saturation in distilled water, precipitate with 10 per cent. solution of caustic soda, filter and wash in water ; dissolve in 2 per cent. carbolic.

The secret of the process is that the stain should not be allowed to act for more than 30 to 50 seconds, then differentiate with absolute alcohol for 2 seconds. The stain should be kept for some time before use ; the authors prefer this method of staining to Giemsa. *D. H.*

LIU (P. Y.), ZIA (Samuel H.) & WANG (K. C.). **Serological Studies on Subjects vaccinated against Typhus Fever.**—*Proc. Soc. Experim. Biol. & Med.* 1938. June. Vol. 38. No. 5. pp. 682–684.

Doctors and nurses exposed to typhus infection in Peiping Medical College Hospital were inoculated with louse vaccine. Material from 100 infected lice was inoculated in each person in three doses at weekly intervals. The reactions of the sera of these persons were studied, the sera were tested against emulsions of Rickettsia and also *Proteus X19* emulsion.

The results of the tests are given in tabular form ; of 121 sera tested 37 gave negative reactions with Rickettsia emulsions, 16 gave negative reactions with *Proteus*. The majority of the sera were tested in the first three months after inoculation. *D. H.*

PIJPER (Adrianus) & CROCKER (C. G.). **Rickettsioses of South Africa.**—*South African Med. Jl.* 1938. Sept. 10. Vol. 12. No. 17. pp. 613–630. With 17 figs. [105 refs.]

A résumé of the work done by the authors on the local or South African types of typhus fevers with suggestions for further intensive research.

As has already been shown there exist in South Africa at least three types of typhus fever, namely tick bite fever, epidemic typhus presumably louse-borne, and sporadic or murine typhus. These three diseases are more closely allied to one another than to the similar diseases of other countries. Tick bite fever resembles boutonneuse fever clinically, primary sore, rash, etc., but cross immunity experiments between these two viruses were negative. The epidemic typhus of South Africa resembles the same disease in other countries but differs in that mortality is less and also the sera of cases agglutinate, as a rule, *Proteus OX19* only in low dilutions and in addition agglutinate *Proteus OX2* and *OXK*. A series of rabbits were inoculated with the virus of South African typhus and the serum of these animals agglutinates *Proteus OX19*, *OX2* and *OXK*, whereas when rabbits are inoculated with the virus of European epidemic typhus virus agglutinins are produced for *Proteus OX19* but not for *OX2* or *OXK*.

The sporadic typhus of South Africa is, as elsewhere, a disease of rats but this disease also produces agglutinins for *Proteus OX19*, *OX2* and *OXK* in the sera of patients.

The virus of epidemic typhus of South Africa as the author has already shown immunizes against sporadic typhus and tick bite fever. The virus of sporadic typhus (S.A.) immunizes against tick bite fever but not against epidemic typhus. Tick bite fever does not immunize against either of the other two viruses. *D. H.*

MATHEW (R. Y.). **Endemic Typhus in North Queensland.**—*Med. Jl. Australia.* 1938. Sept. 3. 25th Year. Vol. 2. No. 10. pp. 371–377. With 2 maps, 4 figs. & 3 charts.

There are two types of typhus group fevers in North Queensland; in one the sera agglutinate *Proteus X19* and correspond to urban or shop typhus, rat typhus; in the other the sera agglutinate *Proteus OXK*; in some of these cases there is a definite primary sore but in others no such lesion can be found and these latter resemble scrub typhus of Malaya.

During two years, 1935–1937, some 300 cases of fever were investigated by the author in North Queensland. Of these, 77 were definitely diagnosed as belonging to the typhus group. All of the six cases in the *X19* class lived and worked in the towns, whereas the cases in the *XK* class occurred in field workers, especially among those who were engaged in clearing scrub or working in fields recently cleared.

Bites of mites and ticks are of frequent occurrence amongst those moving about on the scrub lands. In 17 of the *XK* cases a cutaneous inoculation lesion was present, resembling the characteristic lesion at the site of the mite bite of Japanese River fever, yet in one of these cases a tick had been removed from the skin at the site of the lesion some days previously. No lesion was noted in 30 *XK* cases, and in 24 enlarged and painful lymphatic glands were noted. A rash was observed in all of the 6 *X19* cases. Of the *XK* cases rash was observed in 35 and was not observed in 8. Of the *XK* cases 23 were mild, 22 moderately severe, 10 severe and 5 of grave severity. There were four fatal cases.

Animals were inoculated with blood from the cases and also with emulsion of brain from a fatal case. One hundred and four rodents, rats and bandicoots were examined for the Weil-Felix reaction and attempts were made to isolate a virus from the animals which gave a positive reaction but without result. *D. H.*

NAUDI (J.). **Two Cases of Tropical Typhus.**—*West African Med. Jl.* 1938. Oct. Vol. 10. No. 1. pp. 34–35. With 2 charts.

DAVEY (T. H.). **Serological Report.**—*West African Med. Jl.* 1938. Oct. Vol. 10. No. 1. p. 40.

DERRICK (E. H.). **The Diagnosis of Fevers in South Queensland.**—*Med. Jl. Australia.* 1938. Oct. 29. 25th Year. Vol. 2. No. 18. pp. 723–729. With 6 figs.

SLATINEANU (Al.) & POTOP (I.). Sur les variations de la protidémie et des polypeptides sériques et rachidiens dans le typhus exanthématique.—[**On the Variation of the Protein Content and of the Polypeptides in the Serum and Spinal Fluid in Typhus.**]—*C. R. Soc. Biol.* 1938. Vol. 129. No. 30. pp. 716–718.

i. BOTZARIS (A.). La formule leucocytaire des cobayes inoculés de typhus exanthématique endémique. [**Counts of White Blood Cells in Guineapigs inoculated with the Virus of Endemic Typhus.**]—*Folia Haematologica.* 1938. Vol. 60. No. 4. pp. 365–374. With 13 figs. [24 refs.]

ii. ——. Quelques examens hématocytologiques sur 4 cas de typhus exanthématique endémique. [**Some Haematological Examinations on 4 Cases of Endemic Typhus.**]—*Ibid.* pp. 375–380.

i. The acidophile cells (polymorphs) show a slight increase after the inoculation due probably to the injection of foreign protein; the numbers of these cells then fall to normal but there is a second rise just before and during the fever. Eosinophile cells remain at normal or may be slightly reduced. In animals in which there was a high eosinophile count before inoculation there was a marked fall in the numbers during the fever.

Large mononuclear cells may be five times as numerous during the fever. Lymphocytes are decreased when the polymorphonuclear cells are increased, but there is a late (up to 48 days) increase in convalescence.

ii. Three phases in the cases were considered: (1) The period of the fever up to the defervescence; (2) the period of falling temperature; (3) convalescence.

Résumé.—Increase of red cells was noted in one case up to 7 million per cmm. There was a return to normal 15 days after apyrexia. Leucopenia was noted during the febrile period and was more marked during defervescence but leucocytosis was observed during convalescence. Polymorphs were normal or slightly diminished during the fever and this diminution of numbers is also noted in convalescence. Eosinophiles disappear during the fever, returning to normal in convalescence. Lymphocytes are generally augmented during the fever and a marked and prolonged lymphocytosis during convalescence was the chief item in the blood picture. *D. H.*

PETZETAKIS (M.). Le typhus endémique bénin d'origine murine en Grèce. [**Benign Endemic Murine Typhus in Greece.**]—*Bull. Soc. Path. Exot.* 1938. Nov. 9. Vol. 31. No. 9. pp. 848–855.

The author has repeated the work of Professor LEPINE and confirmed it. He himself has recently observed 12 cases of the disease in and around Athens. A clinical description is given. A murine typhus virus was isolated from the patients and also from rats caught in the same districts. The differential diagnosis is discussed; boutonneuse fever can be distinguished by the characteristic rash and by the presence of the primary sore. Also endemic typhus occurs in association with rats, boutonneuse fever in association with dogs and dog ticks. *D. H.*

RÍSQUEZ (Jesús Rafael), FIGARELLA (Jorge) & VAN PRAAG (Antonio). Primera comunicación clinica sobre tifus exantemático en Venezuela. [**Exanthematic Typhus in Venezuela.**]—*Gac. Med. de Caracas.* 1938. July 31 & Aug. 15. Vol. 45. Nos. 14 & 15. pp. 210–214; 225–234.

The authors give notes of eleven cases of fever with a roseolar exanthem in which they were able to exclude as causes malaria, enteric

(typhoid and paratyphoid) and undulant fever. Two of them gave a positive Weil-Felix reaction with serum diluted to 1 in 800. Three others are mentioned in a *postscriptum* footnote whose sera also gave the reaction in the same dilution. More exact bacteriological reactions to the different types of *Proteus* have not yet been worked out.

H. H. S.

GOHAR (M. A.). **Protective Inoculation against Typhus.**—*Jl. Trop. Med. & Hyg.* 1938. Aug. 15. Vol. 41. No. 16. p. 261.

A method of immunization against typhus by using the carbolized emulsion of the brain of typhus infected guineapigs is described.

D. H.

SCHWEICKHARDT (Erwin). Die Verbreitung des Fleckfiebers in Mexiko und der gegenwärtige Stand seiner Bekämpfung und Behandlung mit Schutzimpfstoff und Heilserum. [**The Distribution of Typhus Fever in Mexico and the Present Position in Regard to Prevention and Treatment by Vaccines and Sera.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Aug. Vol. 42. No. 8. pp. 350–366. With 12 figs. [26 refs.]

In Mexico there are numerous cases of typhus with many deaths in the Central States and only a few mild cases in North-Western districts adjoining the United States, these latter are probably cases of murine typhus. There is no typhus at all in the North-East or in the tropical South-West coastal districts. 1,700 deaths from typhus were reported in 1936. Blood taken from cases during the fever and injected into guineapigs produced fever with orchitis ; in these animals it was noted that there was a strong affinity of the virus for the endothelial cells of the serous membranes. This is taken advantage of in the method of ZINSSER [this *Bulletin*, 1937, Vol. 34, p. 485, 486] in the preparation of vaccines from the numerous Rickettsia found in infected and irradiated rats. The Rickettsia thus obtained are killed by formalin and the vaccines prepared in this way have produced protection against the Mexican type of typhus, although they do not protect against the European virus to the same extent. Horses have been immunized with massive doses of this vaccine and the sera of these animals have been employed in the treatment of cases of typhus fever and in the experimental protection of guineapigs. Twenty patients were treated and marked improvement was noted in 13 of these ; there were only three deaths in treated cases, whereas the usual mortality rate in untreated cases has been 40 per cent. *D. H.*

BLANC (Georges) & BALTAZARD (Marcel). Vaccination contre le typhus exanthématique par virus sec de typhus murin provenant de puces infectées. [**Vaccination against Exanthematic Typhus by Dried Murine Typhus Virus obtained from Infected Fleas.**]—*C. R. Acad. Sci.* 1938. Sept. 26. Vol. 207. No. 13. pp. 547–548.

The faeces of fleas (*X. cheopis*) which had been fed on infected white rats, were collected and dried *in vacuo*. When required for injection

the dried faeces were suspended in a special saline solution and bile in a dilution of 1/150 is added.

Over 1,000 persons have been vaccinated with this bile treated vaccine. The immunity of these persons has been tested by injections of doses of living virus. Only three gave any febrile reaction. The dried faeces can be preserved for long periods, up to one year, and the virus remains alive and potent. The material can be readily sent to a distance and vaccines prepared on the spot. *D. H.*

JORDAN (J. H.) & FLETCHER (A. E.). **A Note on Disinfestation with Particular Reference to Typhus.**—*Chinese Med. Jl.* 1938. July. Vol. 54. No. 1. pp. 71–72.

Tests were made on lice infested clothes with a local liquid disinfectant containing cresylic acid and phenols but without success; however, it was found that if 4 per cent. of ammonia was added to the disinfectant lice and eggs were all destroyed in one hour. Walls and furniture were washed with the solution and clothes were soaked in it.

D. H.

ZIA (Samuel H.) & LIU (P. Y.). **Dissociation of Rickettsia and Proteus X 19 Antibodies in Experimental Typhus Infections.**—*Proc. Soc. Experim. Biol. & Med.* 1938. June. Vol. 38. No. 5. pp. 685–687. With 1 text fig.

In this research a small rodent (*Myospalax fontanieri*) was employed; it was found that these animals were readily infected with typhus virus and when infected the serum gave a strong positive Weil-Felix reaction. The animals were infected by the injection of guineapig brain and were tested over long periods, blood being drawn off from time to time.

Rickettsia emulsions and emulsions of *Proteus X19* were employed. It was found that the agglutinins for Rickettsia appear early and disappear quickly. The Weil-Felix reaction appeared later and lasted longer; also the results were not parallel in the same animal; one would give a high titre for Rickettsia and low Weil-Felix, another a low titre for Rickettsia and a high Weil-Felix reaction, these results agree with those obtained in vaccinated persons by the same observers.

D. H.

PIÉRI (Jean). Histoire de la fièvre boutonneuse. [**A History of Boutonneuse Fever.**]—*Marseille-Méd.* 1938. July 5–15. Vol. 75. No. 19–20. pp. 17–28. With 5 figs.

A review of our knowledge of the fever from the year 1910, when it was first described by CONOR and BRUCH in Tunis, up to the present time.

In 1920 the disease was first noted in Italy and in 1925 in France. In this year the author himself first described the primary sore or *tache noire*. The various papers referred to have all been summarized from time to time in this *Bulletin*. *D. H.*

OLMER (D.) & OLMER (Jean). Virus boutonneux et fièvres exanthématiques. [**The Viruses of Boutonneuse Fever and of the Typhus Fevers.**]—*Marseille-Méd.* 1938. July 5–15. Vol. 75. No. 19–20. pp. 9–16.

A review of the work done by the authors and others on boutonneuse fever and also on other members of the typhus group such as true typhus, murine typhus, Rocky Mountain fever, etc.

The authors sum up by saying that the virus of boutonneuse fever is now well characterized, it is sharply differentiated from the viruses of the typhus group, true typhus and endemic typhus ; it can also be differentiated, although not so certainly, from the virus of Japanese River fever ; it is most closely allied to the virus of Rocky Mountain fever. Nevertheless it is considered that the characteristics of the virus are fixed and confer on it an indisputable individuality.

D. H.

BOISSEAU (R.). Sur un cas de fièvre boutonneuse expérimentale observé chez l'homme. [**On a Case of Experimental Boutonneuse Fever observed in Man.**]—*Bull. Soc. Path. Exot.* 1938. Oct. 12. Vol. 31. No. 8. pp. 743–752. With 2 figs. [21 refs.]

On 1st June, 1938, the author inoculated into the skin at the back of his left forearm, a minute dose of boutonneuse virus. This virus had originally been isolated from dog ticks and had then been passaged for over 40 generations in guineapigs ; it could thus be regarded as a fixed and pure virus. The inoculation was made with a fine needle directly under the epidermis. In 36 hours there was some redness and slight thickening could be felt at the site of inoculation ; in 48 hours the lesion had increased in size and a small papule appeared

Local lesion 12 days after the inoculation into the skin of a minute dose of boutonneuse virus. [Photographed by Dr. LORANDO.]

[Reproduced from the *Bulletin de la Société de Pathologie Exotique.*]

in the centre, no pain was felt and there was no fever. On the 4th day the centre of the primary sore became definitely black; on the 5th day the sore had increased in size but no swollen or inflamed glands could be detected. On the 6th day the primary sore had reached its zenith and measured about 3 cm. in diameter and the black centre about 1 cm. (see Fig.). It was extremely tender but the surrounding skin was perfectly normal and not sensitive. On the 7th day from inoculation the sore began to recede and at the same time the invasion of the general system commenced. The temperature rose to 39°C. and a rash was noted on the arms and legs. Muscle pains were noted on the following day, the lumbago and pains in the legs were acute. On the 12th day headache began and lasted for 3 or 4 days, insomnia also was persistent throughout the illness. Neuralgia and earache were specially troublesome also pains in the joints. The writer sums up his experience as follows: "a malady without real gravity but affecting all the organs of the body." The Weil-Felix reaction was positive for *Proteus OX19* in 1/200 dilution. *D. H.*

GIBBONS (R. J.). **Sylvatic Plague and Rocky Mountain Spotted Fever Surveys, in Western Canada, during 1938.**—*Bull. Brit. Columbia Board of Health.* 1939. Mar. Vol. 9. No. 3. pp. 30–33.

In most such surveys the outcome to be expected is the finding among rodents of a widespread infection or an epizootic. This, however, was not the case on the present occasion, where a cooperative effort was made to cover the provinces of Alberta and British Columbia, including the seaports of Vancouver and New Westminster. The staff was vaccinated as a preliminary with Rocky Mountain spotted fever vaccine.

In summary it was found that:— 1. (*a*) Rocky Mountain spotted fever has been endemic in Western Canada since at least 1917; (*b*) No evidence of infection with the Rickettsia of Rocky Mountain spotted fever was found in 30,000 ticks collected, although *Bact. tularense* infection was found. 2. No evidence of *P. pestis* infection was encountered in 3,569 wild rodents and 7,582 rodent fleas of Alberta and British Columbia, nor in the 1,277 rats and 1,178 rat fleas of Vancouver and New Westminster. *W. F. Harvey.*

PILCHER (Lewis S.). **Rocky Mountain Spotted Fever in Massachusetts. Report of a Case.**—*New England Jl. of Med.* 1938. Sept. 15. Vol. 219. No. 11. pp. 378–382.

A case of Rocky Mountain fever, eastern type, which occurred in Massachusetts in July 1937, is reported. Two other cases which received their infection in Massachusetts during July 1937, but were treated in Rhode Island, have also been recently reported. These cases are apparently the first instances of this disease to be diagnosed in the New England area. *D. H.*

FLIPPIN (Harrison F.). **Typhus Fever in Pennsylvania.**—*Amer. Jl. Med. Sci.* 1938. Aug. Vol. 196. No. 2. pp. 246–252. With 2 figs. [19 refs.]

An historical account of the incidence of typhus in Pennsylvania. The last reported outbreak of epidemic typhus was in 1883; endemic

typhus was first reported in 1911 and 27 cases have been recorded up to date; it is suspected that some of these were Rocky Mountain fever. *D. H.*

JORDAN (Carl F.). **Rocky Mountain Spotted Fever and Tick Survey in Iowa.**—*Amer. Jl. Public Health.* 1938. Dec. Vol. 28. No. 12. pp. 1411–1414.

During the five-year period 1933–37, 2,190 cases of Rocky Mountain spotted fever were reported in the United States as a whole, distributed as follows:—

	Per cent.
The Mountain and Pacific States	65·5
South Atlantic States	27·4
North and South Central States	5·4
New England and Middle Atlantic States	1·7

The first case of spotted fever in Iowa State was reported in 1933 and to date 38 cases have been officially notified. A clinical description of the cases follows, the mortality rate was 24 per cent., although the majority of the cases were mild. Nearly half the patients were children and 32 out of the 38 cases occurred on farms or in rural areas and most were associated with dogs heavily infested with ticks (*D. variabilis*).

A tick survey was undertaken and numerous ticks were collected and sent to Montana for examination, practically all were *D. variabilis*; the animal hosts of these ticks besides the dog were cows, sheep, horses, goats and also squirrels, rabbits and wood chucks. Ticks collected from the Indian Reserve where cases had occurred and also from a farm where three children had had spotted fever (one died) were proved to harbour the virus of Rocky Mountain spotted fever. *D. H.*

BISHOPP (F. C.) & SMITH (C. N.). **The American Dog Tick, Eastern Carrier of Rocky Mountain Spotted Fever.** *Circ. U.S. Dep. Agric.* Washington, D.C. 1938. Apr. No. 478. 25 pp. With 13 figs. [15 refs.] [Summarized in *Rev. Applied Entom.* Ser. B. 1938. Dec. Vol. 26. Pt. 12. pp. 249–251.]

"A detailed account is given of the bionomics of *Dermacentor variabilis*, Say, which is the principal, if not the only vector of Rocky Mountain spotted fever in the central and eastern portions of the United States, where an average of 140 cases occurs annually with a death rate of 25 per cent. It is also a vector of tularaemia in man and animals and of anaplasmosis [*Anaplasma marginale*] in cattle. It is a serious pest of dogs, causing severe irritation and loss of condition, and often infests horses.

"It is widely distributed throughout the United States east of the Rocky Mountains, in western and northern California, and in parts of Oregon; it is most abundant along the eastern coast from Massachusetts to Florida. It seems likely that low relative humidity is the most important factor limiting its distribution and abundance in the eastern states. It is most numerous in areas covered with grass or underbrush and occurs less frequently in forests, where the species of mice that serve as hosts of the immature stages are less numerous. The dog is the chief host of the adults, though others of the larger mammals may also be infested. Rabbits appear to be of little importance, and birds are not attacked.

"Unengorged adults live for long periods; one female kept under observation lived at least 988 days and possibly as much as 1,053. Adults, as well as other stages, require considerable moisture, and if kept under

dry conditions live for much shorter periods. The longevity of adults that have attached to hosts is comparatively short. Most of the males and slightly engorged females that are removed from a host die within a few weeks, though occasionally one may live for 5–6 months. This is of some importance, since the organism causing Rocky Mountain spotted fever is activated in the tick by feeding and such partly engorged ticks may transmit the disease during a very short period of attachment. Engorgement of females, which is retarded by the absence of males, normally requires 5–13 days. Pairing takes place on the host 4–6 days after attachment, but is always preceded by a feeding period in both sexes. The preoviposition and oviposition periods varied with the temperature from 3 to 24 days and 14 to 32 days, respectively. Eggs are laid in large masses in protected places on the ground ; a female usually lays between 4,000 and 6,500 and dies 3–36 days after the completion of oviposition. The larvae remain in masses on the soil or on low-growing vegetation and, if conditions are sufficiently moist, survive for long periods. In the laboratory the maximum period was between 345 and 377 days. The average period for engorgement was 4·14 days. During the winter, the period during which the larvae dropped from the host was distinctly prolonged, though the period of engorgement was almost identical whether the hosts were kept in a warm or a cool room. The engorged larvae seek shelter on the soil surface. The period from dropping to moulting is markedly influenced by temperature ; it varied from 6 days at about 84°F. to 87 days at about 55°. The maximum longevity of unfed nymphs kept on moist sand was between 274 and 309 days, but most of them did not live more than 6 months. The period required for engorgement averaged 5·2 days. The period from dropping to moulting ranged from 17 to 105–109 days, being greatly prolonged during cold weather.

" The seasonal incidence of the adult ticks is discussed ; it varies in different parts of the United States, but, in general, the adults are most abundant in spring and early summer, and their numbers diminish sharply in the hot, dry months in late summer. In the south, they have been taken in every month of the year, and breeding continues, though at a slower rate, throughout the winter. In the colder parts of the country, over-wintering may take place in all stages but the egg. As few females become engorged and lay eggs in late summer, most eggs hatch before the onset of winter. Unfed adults found completely quiescent in clumps of bunch grass became active in a short time when warmed. Larvae and nymphs occur on mice and other small mammals throughout the winter ; their numbers increase after periods of mild weather and decrease almost to nil after severe weather. It appears that ticks that engorge during the winter all moult during a comparatively short time in spring.

" Climatic factors are probably the chief ones exercising natural control of this tick, and of these excessive dryness is the most important. *D. variabilis* is very resistant to cold. Predators such as poultry, wild birds and mice doubtless destroy many ticks, especially engorged females. The need for further work on the parasite, *Hunterellus hookeri*, How., is emphasised. In areas where there is an abundance of both small and large animals, the complete control of ticks by artificial means would appear to be almost impossible, but in certain areas large wild animals suitable as hosts for the adults are few or absent, and under such conditions the treatment of dogs would probably result in satisfactory control, particularly if measures were also taken to reduce the numbers of meadow mice (*Microtus pennsylvanicus*), the principal hosts of the immature stages. An effective dip or wash for dogs can be made by dissolving 1 oz. soap in 1 U.S. gal. water and adding 2–4 oz. derris powder with a rotenone content of 4 per cent. This treatment, which should be applied at intervals of 5–6 days, will greatly reduce the number of ticks that become attached and prevent engorgement and reproduction. Derris powder is easier to apply but is not so effective and should be used at shorter intervals (2–3 days). Other measures recommended include clearing undergrowth and

keeping grass closely cut, especially near habitations, etc., and the use of clothing designed to prevent infestation when it is necessary to traverse infested areas."

BRIGHAM (George D.). **Endemic Typhus Virus in Mice.**—*Public Health Rep.* 1938. July 22. Vol. 53. No. 29. pp. 1251–1256. [14 refs.]

Endemic typhus virus can be maintained in native field mice which are numerous in the typhus area of Alabama. In the cotton mouse the virus was transferred through 16 generations before it was lost. In old field mice the virus has been carried through 36 passage generations. The virus has been found to survive 141 days in the cotton-mouse, 141 days in the old field mouse and 76 days in the golden mouse. *D. H.*

BRIGHAM (George D.). **Susceptibility of Animals to Endemic Typhus Virus. (Second Report.)**—*Public Health Rep.* 1938. Nov. 25. Vol. 53. No. 47. pp. 2078–2079.

In a previous report from the same laboratory at Alabama it was reported that several species of field mice and rats were susceptible to endemic typhus virus; also a typhus virus had been isolated from an old field mouse captured in the district. In addition it is now reported that the grey squirrel, fox squirrel, cotton tail rabbit, swamp rabbit, chipmunk and skunk are all susceptible to inoculation with the virus. But racoons and the grey fox are not susceptible. *D. H.*

DAVIS (Gordon E.) & PARKER (R. R.). **A Comparative Study of Two Strains of Rocky Mountain Spotted Fever Virus with Special Reference to the Weil-Felix Reaction.**—*Public Health Rep.* 1938. Aug. 26. Vol. 53. No. 34. pp. 1525–1531. With 6 charts.

It was found that there were five types of serological reaction with various strains of *Proteus* in patients suffering from Rocky Mountain fever. Thus

(1) *X19* high titre	*X2* low titre
(2) *X19* low ,,	*X2* high ,,
(3) *X19* positive	*X2* negative
(4) *X19* negative	*X2* positive
(5) *X19* titre equal to *X2*	*X2* titre equal to *X19*

Two strains of virus were isolated from patients of types (2) and (3) and comparative studies made of these two strains. Cross immunity tests were carried out but no immunological difference could be made out. Rabbits were inoculated with the two strains but no difference in immunological or serological response could be detected. Strain 3, which produced only agglutinins for *Proteus OX19* in man, produced agglutinins for both strains in rabbits. Protection tests were carried out and it was found that immune sera of either strain neutralized the other. *D. H.*

DIAS (Emmanuel). O cão como provavel reservatorio do virus da febre maculosa brasileira. [**The Dog as a Likely Reservoir of the Spotted Fever of Brazil.**]—*Brasil-Medico.* 1937. Dec. 18. Vol. 51. No. 51. pp. 1245–1247. [12 refs.]

The denomination of *Brazilian spotted fever* is now used for the São Paulo type of endemic typhus or the " exanthematic typhus of

Minas Geraes." Ticks of the *Amblyomma* genus, namely *A. striatum* and *A. cajennense*, are known vectors and they are found in dogs. Moreover, the serum of such dogs gives a positive Weil-Felix reaction with varieties of *Proteus*, namely to 1 in 640 with *Proteus HXK*; up to 1 in 320 with *Proteus OX19, OX2* and *HX1*; to 1 in 160 with *Proteus HX19, HXK* and *OXL*, and to 1 in 80 with *Proteus HX2* and *HXL*. This fact brings the Brazilian type of fever more closely into line with Rocky Mountain spotted fever carried by the dog-tick *Dermacentor variabilis* and boutonneuse fever by *Rhipicephalus sanguineus* found on dogs on the Mediterranean littoral. *H. H. S.*

TRAVASSOS (J.). Le chien réservoir de virus possible du "typhus exanthématique de São Paulo." [**The Dog as a Possible Reservoir of the Virus of São Paulo Typhus.**]—*C. R. Soc. Biol.* 1938. Vol. 129. No. 24. pp. 74–76.

The author has already shown that ticks of the species *Amblyomma striatum*, taken from dogs captured in the quarter of São Paulo where the fever occurred, were infective for guineapigs. Four dogs were caught and killed, in one case a Weil-Felix reaction for *Proteus X19* in a dilution of 1/160 was obtained, the blood and organs were injected into guineapigs, in two of these slight fever was noted and these two animals when tested later were immune. Dogs can be infected by injection of virus and the Weil-Felix reaction becomes positive and the blood of the dogs was shown to be infective by the 11th day after inoculation. *D. H.*

DE MAGALHÃES (Octavio). Typho exanthematico em Minas Geraes. (IIa communicação.) [**Typhus Fever in Minas Geraes.**]—*Brasil-Medico.* 1938. July 9. Vol. 52. No. 28. pp. 634–638. With 1 fig.

The author has previously reported that typhus in Minas Geraes may be transmitted by ticks and occasionally by the bug, *C. lectularius*. In the present communication he records more details of animal experiments with *Amblyomma cajennense* as the vector. He finds that the tick having fed on an infected animal becomes infected and after an interval of 30 hours remains infective for life. When allowed then to feed on a guineapig the latter contracts the disease with an average incubation period of 5·4 days. *H. H. S.*

DE MAGALHÃES (Octavio). Typho exanthematico em Minas Geraes. Anatomia pathologica. [**The Morbid Anatomy and Histology of** *Typhus exanthematicus* **in Minas Geraes.**]—*Brasil-Medico.* 1939. Jan. Vol. 53. No. 5. pp. 104–113. With 14 figs.

This article cannot be abstracted; those interested must consult the original. In it are described the naked-eye changes seen in the viscera—heart, spleen, liver, pancreas, kidneys, brain, etc.—and the pathological histology of the lesions. *H. H. S.*

GUNTHER (Carl E. M.). **The Probable Vector of Endemic Typhus in New Guinea.**—*Med. Jl. Australia.* 1938. Aug. 6. 25th Year. Vol. 2. No. 6. pp. 202–204.

Clinically and serologically "endemic typhus" of New Guinea resembles tsutsugamushi fever. The sera of patients agglutinate

Proteus XK and not *X*19. By analogy, therefore, the vector should be a larval mite. Larval mites are abundant in New Guinea where they are called in pidgin-English, *bush mokka*. In patients suffering from fever there is always a history of a recent stay in mite-infested country. The primary sore is always found at one of the sites favoured by the mites. The ordinary bites of mites give rise to intense itching and are usually infected by scratching whereas the primary sores in fever cases are not itchy and are rarely secondarily infected.

Although practically every person who goes into the bush and swamps is bitten freely by mites only a few cases of fever are met with each year. This may be explained either by the supposition that the vector is one of the rare species of mites or that the common mite, *Trombicula hirsti*, is only rarely infected. This mite is frequently found on man and is a parasite of birds but also of the bandicoot. The numerous mites from the birds would not be infective, whereas the few derived from the rodents might be. Other species of mite may carry the infection from one rodent to another, but they do not attack man. *D. H.*

HEINEMANN (H.). Over reinfecties met pseudotyphus (mijtekoorts). [**Reinfection with Pseudotyphus (Mite Fever).**]—*Geneesk. Tijdschr. v. Nederl-Indië.* 1938. Nov. 29. Vol. 78. No. 48. pp. 3037–3040. With 1 plate & 2 charts.

A European was bitten on 24th July, 1938, by mites; he developed a small round ulcer on the thigh on the same day and fever a week later. The course of the affection was typically that of pseudotyphus and this would not have required special notice but for the fact that the same patient had had an attack of the same disease a year previously. Little, if any, immunity seems to have been given by the first attack, for the second one was even more severe. Out of 256 cases of pseudotyphus recorded in hospital there were found, the present case included, three of second infection and the intervals to this second infection were 1 year, 2½ years and 18 months respectively.

W. F. Harvey.

DAVIS (Gordon E.); COX (Herald R.); PARKER (R. R.); DYER (R. E.). **A Filter-Passing Infectious Agent isolated from Ticks. I. Isolation from** *Dermacentor andersoni*, **Reactions in Animals, and Filtration Experiments** [DAVIS & COX].—*Public Health Rep.* 1938. Dec. 30. Vol. 53. No. 52. pp. 2259–2267. **II. Transmission by** *Dermacentor andersoni* [PARKER & DAVIS].—*Ibid.* pp. 2267–2270. **III. Description of Organism and Cultivation Experiments** [COX].—*Ibid.* pp. 2270–2276. **IV. Human Infection** [DYER].—*Ibid.* pp. 2277–2282. With 1 fig.

In the spring of 1935, 200 ticks (*Dermacentor andersoni*) were collected from Nine Mile Creek about 30 miles from Missoula in Montana. These ticks were divided into four batches of 50 and each batch was fed on a normal guineapig; one of the guineapigs developed fever on the 12th day after the ticks had been placed on it and ran a high and continuous fever and died on the 20th day. Four cc. of blood was taken from this animal on the 2nd day of the fever and this was inoculated intraperitoneally into two other guineapigs, both developed a similar fever and both died; post-mortem appearances

were similar in all three, namely enlarged lymph glands, swollen dark red smooth spleen, and some injection of the testes and tunicae.

This infection has been maintained ever since in guineapigs by the intraperitoneal or subcutaneous injection of blood or spleen of infected animals. When the inoculation was made subcutaneously there was a local inflammatory reaction at the site of injection. Thrice washed red cells from an infected guineapig still retained the infection. Immunity to the disease was present for at least 115 days after the fever.

Filtration.

Blood was taken from an infected guineapig on the 3rd day of fever; this was placed in citrate solution and centrifuged. The citrated plasma was then filtered through a Mandler filter and 1 cc. of the filtrate was injected into two guineapigs. Both developed fever and died and both showed the typical post-mortem appearances. Further filtration experiments on similar lines have conclusively shown that the infectious agent readily passes through Berkefeld N and W filters; but it was not found possible to pass the virus through a Seitz disc. The spleen of an infected guineapig was removed and placed in glycerine. From time to time portions were removed and emulsified and injected into normal animals; after 16 days in glycerine infection was produced in guineapigs and there was evidence that the virus was still active up to 90 days. White rats and white mice were readily infected by the injection of blood or spleen of infected guineapigs but rabbits and monkeys were resistant. Squirrels and chipmunks could also be infected with the virus.

Guineapigs which had recovered from this virus infection were not resistant to infection with the viruses of typhus or Rocky Mountain spotted fever, nor vice versa.

Transmission in Ticks.

A series of experiments was carried out on the transmission of the virus by means of ticks, *D. andersoni*. Larvae were fed on infected guineapigs and it was found that nymphs and adults developed from these larvae were capable of infecting normal guineapigs. Eggs were collected from some of these infected ticks and the larvae which developed from these eggs infected guineapigs when they were allowed to feed. Clean nymphs and adults fed on infected guineapigs were collected after feeding and emulsified and injected into normal guineapigs, these also became infected; blood was taken from the infected guineapigs, the serum filtered and injected into other guineapigs, which in turn became infected and showed the usual post-mortem appearances, enlarged lymph glands and swollen smooth dark red spleen. When the infected tick emulsion was injected into guineapigs which had recovered from the previous attack of the fever they did not react.

Description of Organism.

Guineapigs were infected and killed at intervals during the febrile period, smears were made from the tunicae and from the exudate on the enlarged spleen, these smears were stained by Giemsa stain. No "inclusion" bodies were seen but numerous minute delicate extracellular and intracellular pleomorphic Rickettsia-like organisms were observed; emulsion of spleen of an infected guineapig was centrifuged and filtered and injected into two guineapigs, both became

infected and the same Rickettsia-like bodies were found in stained smears of the spleen exudate in these animals. The pleomorphism of these small bodies is very marked, rods, bipolar rods, diplobacilli, filamentous forms, chains of cocci and nests of cocci in the cytoplasm of cells were all noted.

These small bodies resemble typhus Rickettsia closely but are more slender and minute, they also resemble *Bartonella bacilliformis* in Carrión's disease, but are not seen in the red cells, do not grow in Noguchi's medium, and when injected into the eyebrow of monkeys no verruga nodules are formed.

In tissue culture the virus was readily cultivated and carried in transfer in subcultures, the medium used was minced chick embryo tissue in human ascitic fluid. The small Rickettsia could be demonstrated in the tissue cells in every transfer. The conclusion is that the infectious agent isolated from ticks resembles Rickettsia in every respect except that it has not been found in the tissue of the ticks.

In 1926 Noguchi isolated from ticks collected in the same district in Montana a similar filter-passing virus. Although Noguchi found that monkeys could be infected with the virus, it is quite probable that the two infections are identical.

A worker in the laboratory who had handled infected ticks and guineapigs became infected with the fever; 5 cc. of his blood taken on the 6th day of illness and injected into guineapigs proved infective and this strain of virus has been passaged for 20 generations in guineapigs. The serum of this patient neutralized the original strain of virus isolated from the ticks. There was no cross immunity between this human strain of virus and the viruses of typhus or Rocky Mountain spotted fever. It is probable that this new virus is similar to that of the so-called Q fever of Australia [see this *Bulletin*, 1938, Vol. 35, pp. 62, 63]. *D. H.*

Archer (G. T. L.). *Proteus muar* **isolated from a Mouse.**—*Jl. Roy. Army Med. Corps.* 1938. Aug. Vol. 71. No. 2. pp. 106–108.

An organism isolated from the heart blood of a mouse in the laboratory was shown to have all the character of *Proteus muar*; alcoholized suspensions of this bacillus were agglutinated by *Proteus OXK* serum but not by *HX19* or *HX2*. Cross agglutination and absorption tests carried out established complete identity with the type strain obtained from the Lister Institute. *D. H.*

DENGUE AND SANDFLY FEVERS.

Précis of Abstracts in this Section.

Wakil and Hilmy (p. 482) describe the Cairo epidemic of 2,594 cases of dengue in 1937 in which 50 deaths took place from complications in heart or lungs. Magliano and Azzi (p. 482) describe an epidemic of dengue in Abyssinia in which two waves of morbidity occurred, separated by a period of about 10 days when no cases were seen. There were no deaths.

Sanner and Destribats (p. 483) describe the characters of dengue-like fevers in Dégo-Suarez.

SHORTT, PANDIT and RAO (p. 483) isolated the virus of sandfly fever from the sera of patients. The sera had been in cold storage for a month. Mixture of these sera with sera from convalescent patients inhibited growth. *C. W.*

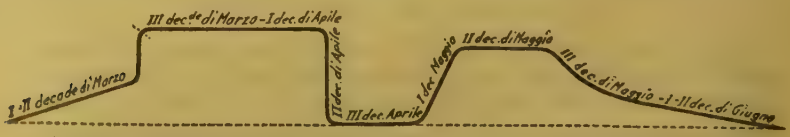
WAKIL (A. W.) & HILMY (F.). Épidémie de dengue au Caire en 1937. [**Epidemic of Dengue in Cairo in 1937.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Aug. Vol. 30. No. 8. pp. 1821–1841. With 1 map & 3 graphs. [25 refs.]

The epidemic commenced in the first week of September but the origin of the outbreak could not be traced. 2,594 cases were reported in Cairo itself and these represented about 92 per cent. of all the cases in the country.

The maximum number of cases was reported in the week ending 11th November and the cases ceased at the end of the year. There were 50 deaths due to various complications in heart or lungs. A full clinical description of cases is given. *D. Harvey.*

MAGLIANO (Giovanni) & AZZI (Enrico). Epidemia di dengue sulle coste della Migiurtinia durante le operazioni per la conquista dell'Impero. [**Epidemic of Dengue on the Coast of Migiurtinia during the Abyssinian Campaign.**]—*Ann. di Med. Nav. e Colon.* 1938. July–Aug. Vol. 44. No. 7–8. pp. 337–344. With 1 fig. & 4 charts.

The earlier cases of the outbreak, which lasted from March–June 1936, were atypical and of an influenzal type, slight fever and joint pains, and rash so little in evidence as to be in some cases overlooked. The morbidity varied as shown in the accompanying graph ; 10–12 per cent. in the early days of the outbreak, 18–20 during the acme, then a lull for some ten days and finally a descending incidence of 12–8 per cent. The author divides the outbreak into seven periods : First, extending over the first three weeks of March, characterized by mild and atypical cases ; next, the period of higher morbidity during the last decade of March and the first of April, followed by a rapid remission and complete absence of fresh cases, both these occupying about 10 days each. Then came a second wave continuing to rise to an acme during the first ten days of May, remaining at the new level for another ten days and during the next four weeks slowly declining. The whole outbreak, therefore, covered nearly four months. The actual number of cases is not stated. None was fatal, though one officer died of heatstroke ten days after recovery from an attack of dengue.



Graphic representation of course of epidemic of Dengue from March to June, 1936, on the Coast of Migiurtinia.

[Reproduced from the *Annali di Medicina Navale e Coloniale.*]

H. H. S.

SANNER & DESTRIBATS. Contribution à l'étude de la fièvre à phlebotomes et des pseudo-dengues (" Dengue Like Fevers " des auteurs anglais), observées à Diégo-Suarez. [**Contribution to the Study of Sandfly Fever and " Dengue Like " Fevers observed at Diégo-Suarez.**]—*Ann. de Méd. et de Pharm. Colon.* 1938. July–Aug.–Sept. Vol. 36. No. 3. pp. 609–632. [12 refs.]

The " dengue like " fevers differ from true dengue by the habitual absence of a rash and the mildness of the pains; these fevers are characterized by the slow pulse during fever, the violence of the headache, insomnia, the frequency of relapses or recurrences and modification in the spinal fluid, with marked effects on the nervous system, weakness during convalescence, tendency to haemorrhages and liver and kidney troubles. *D. H.*

SHORTT (H. E.), PANDIT (C. G.) & RAO (R. Sanjiva). **The Virus of Sandfly Fever in Culture and Certain of its Properties.**—*Indian Jl. Med. Res.* 1938. July. Vol. 26. No. 1. pp. 229–239.

Sera of sandfly fever patients were mixed with a small quantity of normal human serum and inoculated into the chorio-allantoic membrane of chick embryos. The technique followed was similar to that described by the authors in 1936. The virus was also grown in tissue culture consisting of embryo chick emulsion and Tyrode solution in 50 cc. flasks. Twenty-seven sera in all were tested; out of 13 pooled batches of sera (two samples in each batch) seven gave a growth of virus. These sera had already been in cold store for a month and had been five days on the journey from Peshawar to Madras. When the sera of convalescents from the disease was mixed with the inoculum and held in contact for 30 minutes, growth on the egg membranes was inhibited.

Inoculations were made into mice but without any definite results, although the virus could be recovered from the heart blood and brain of the animals up to nine days after inoculation. Cultured virus was sent to England by air and was successfully subcultured on arrival there. *D. H.*

OROYA FEVER AND *BARTONELLA* INFECTIONS.

PRÉCIS OF ABSTRACTS IN THIS SECTION.

MACKEHENIE (p. 484) describes experimental infection with Bartonella cultivated from a patient with Oroya fever. A local lesion followed by a granuloma, with lymphatic and blood spread and general (but sometimes delayed) symptoms of fever and anaemia, follow and subsequent trauma or intercurrent disease may determine the onset.

PITTALUGA (p. 484) discusses *Bartonella bacilliformis*, transmitted probably by a Phlebotomus or possibly a tick, *B. muris* by rat louse or flea, *B. canis* and *B. bovis*. Splenectomy transforms a mild anaemia in rats infected with *B. muris* into a grave form. The rôle of the spleen and reticulo-endothelial system in protection is discussed, but it is pointed out that Carrión's disease in man is not comparable with the infection of animals by *B. muris* and *B. canis* or with that in monkeys caused by infection by *B. bacilliformis*.

LAWKOWICZ (p. 485) found that all the white rats in the laboratory were infected with *B. muris*; the carrier was the rat louse. Splenectomy caused the development of anaemia and rendered cured animals susceptible to subsequent infection. The serum of infected rabbits gave the Weil-Felix reaction with *Proteus OX19* and *OXK*, and agglutinated *Rickettsia prowazeki*. WEINMAN (p. 486) shows that *B. muris* appears to be the direct cause of the haemolysis to which the anaemia of infected rats is due. ALSTED (p. 486) shows that in those splenectomized rats which recover from Bartonella anaemia there develops an immunity which is more marked than that which follows latent infection, though the latter produces some degree of immunity apart from splenic function. *C. W.*

i. MACKEHENIE (Daniel). Un caso de verruga humana por auto-inoculación experimental. [**Experimental Verruga peruviana in Man.**]—Reprinted from *Reforma Méd.* 1937. Sept. 15. No. 267. pp. 1–5.

ii. KUCZYNSKI-GODARD (Maxime H.). Nota adicional. El curso de la infección experimental.—*Ibid.* pp. 7–13. With 5 figs. on 2 plates.

i. The cases of CARRIÓN and ROSELL are classical and well known, the name of the former being inseparably connected with the disease. The present article gives an account of the results obtained by Professor Kuczynski from inoculation of a culture of Bartonella grown from a fatal case of Oroya fever. The culture was made on blood-agar and for injection was emulsified in saline; inoculation was made intracutaneously. Three kinds (or stages) of lesion followed: 1. The primary local effect—red or violet spots persisting for several weeks, due, therefore, not to the needle-prick but to the organisms deposited. 2. Granulomata at first local and often apparently increased in size by trauma, of a fungating character bursting through to the surface. 3. Distal lesions, disseminated by lymphatics from the primary lesion first and later by the blood stream.

General symptoms present were fever, diminution in red cell count and in the haemoglobin percentage, joint pains and enlargement of the spleen. Joint pains may occur at each inoculation after the first and these are probably allergic in nature. There may be no symptoms for a long time—an inapparent infection—but that the organisms have not been destroyed is evidenced by the fact that subsequent trauma or some disease or condition disturbing equilibrium (fracture of the femur in one patient) may precipitate onset of symptoms.

ii. In the second paper Professor Kuczynski gives details of dates of inoculation and of the local and blood changes produced from time to time. The histological changes, those in himself and in an experimental monkey, are well shown in photomicrographs. *H. H. S.*

PITTALUGA (G.). Les infections à "Bartonella." [**The Bartonella Infections.**]—*Bull. Inst. Pasteur.* 1938. Oct. 31. Vol. 36. No. 20. pp. 961–979. [68 refs.]

A review of present knowledge regarding these infections.

In addition to *Bartonella bacilliformis*, the germ of Carrión's disease, there are also *B. muris* in the rat and large numbers of similar parasites in other small rodents, *B. canis* of the dog and *B. bovis* of cattle. The vector of *B. bacilliformis* is considered to be a Phlebotomus but

possibly it may also be carried by a tick. *B. muris* is carried from rat to rat by the rat louse and possibly also by the rat flea. If young normal rats are inoculated with blood containing *B. muris* the parasites soon appear in the blood and the animals develop a mild transient anaemia but if the spleen is removed from these animals a grave form of anaemia results and at least 60 per cent. die. Races of *B. muris* have been met with which produce fatal anaemia in white mice without removal of the spleen. As regards the rôle of the spleen in protection of infected animals the author holds that this is threefold.

(*a*) Large numbers of red cells which contain *B. muris* are destroyed in the spleen.

(*b*) The spleen secretes a hormone which destroys or neutralizes the parasite. This is demonstrated by the fact that the injection of spleen juice or introduction of spleen grafts from normal rats prevents or cures anaemia in splenectomized rats.

(*c*) The spleen also plays a part in the condition known as premunition as long as parasites are present in the body.

It is possible also that the spleen plays a protective part in Carrión's disease in man and in this way the long latent periods noted in man could be explained. The reticulo-endothelial system also plays a part in the control of the parasites; when this system is blocked or interfered with by a concurrent disease (trypanosomiasis) there is a sudden invasion of the blood and anaemia follows.

As regards treatment *B. muris* and *B. canis* are highly susceptible to injections of arsenobenzoles but these drugs have little effect on the human disease.

Conclusions.—Carrión's disease is not comparable in its evolution with the infection of animals caused by *B. muris* and *B. canis* or to the disease in monkeys, caused by the injection of *B. bacilliformis*. For these reasons *B. bacilliformis* should be separated from the other members of the group.

Besides a revision of the genus Bartonella it is necessary to consider the whole question in a new light. These infections should be considered as diseases provoked either by splenectomy or by the proliferation of other viruses in the organs of man or animals determining an invasion of Bartonella and transforming a latent infection into a manifest disease. *D. Harvey.*

LAWKOWICZ (W.). Recherches expérimentales sur "Bartonella muris." (Note préliminaire.) [**Experimental Research on** *Bartonella muris.*]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Aug. Vol. 30. No. 8. pp. 1781–1784. [10 refs.]

Two strains of the parasite isolated from the blood of rats were cultivated on semi-solid medium and later grew well on blood agar.

It was found that the white rats in the laboratory were all infected. The carrier is the rat louse. The spleen was removed from 154 of these rats and all developed anaemia. It was found also that adult rats from which the spleen had not been removed were not susceptible to infection with blood or with cultures of the parasites (immunity due to latent infection of some duration). Young rats could be infected. Adult rats treated with arsenobenzol to exclude pre-existing infection and then splectomized did not develop anaemia, but if a dose of live culture was given they developed severe anaemia. The serum of rabbits which had been inoculated with cultures of *Bartonella muris*

gave positive Weil-Felix reaction with *Proteus OX19* and *OXK* and also agglutinated emulsions of *Rickettsia prowazeki*. After several subcultures there was a loss of virulence in the cultures on blood agar but this was re-established when the parasites were subcultured into semi-solid medium. [See also this *Bulletin*, 1929, Vol. 26, p. 519.] *D. H.*

WEINMAN (David). **On the Cause of the Anemia in the Bartonella Infection of Rats.**—*Jl. Infect. Dis.* 1938. July–Aug. Vol. 63. No. 1. pp. 1–9. With 1 fig. [20 refs.]

The *Bartonella muris* anaemia of rats is due to blood destruction and is accompanied by haemolysis. When *in vivo* haemolysis occurs, haemolysis *in vitro* can be demonstrated. Extra corporeal haemolysis takes place with washed erythrocytes suspended in isotonic saline solution and also in serum.

The parasite *Bartonella muris* appears to be the direct cause of erythrocytolysis and thus of haemoglobin liberation for the following reasons :—

(*a*) It is present within or upon cells when lysis occurs.
(*b*) When no parasites are visible there is no lysis.
(*c*) Fragmented cells contain parasites.
(*d*) The more fragile pale cells are the heavily-parasitized ones.

D. H.

ALSTED (Gunnar). **Studies on Immunity in Bartonella Anaemia.** *Acta Path. et Microb. Scandinavica.* 1938. Supp. 37. pp. 37–59. [19 refs.]

Previous work has suggested that protection from Bartonella infection is due entirely to splenic function ; yet these parasites disappear from the blood of rats, from which the spleen has been removed, after recovery from the anaemia. Also in latent infections there is a mortality of 7 to 30 per cent., whereas in infection after splenectomy 97 per cent. of rats die. Heating kills some but not all of the parasites in blood taken from infected animals ; if such blood is injected into rats it produces severe infections but after a prolonged incubation period. The length of the incubation period depends on the number of parasites in the injected blood but the severity of the attack does not. Eleven rats which had survived Bartonella anaemia were observed over long periods and it was found that the parasites disappeared from the blood in 26 to 30 weeks after the anaemia had ceased.

Ten of these rats were re-inoculated and 9 were resistant ; only one showed a slight infection. The spleens of these rats had previously been removed. It is obvious that there is a gradual production of immunity after recovery from anaemia ; this immunity is much more marked than that which follows a latent infection.

Nine rats which had showed a latent infection for about one month all died of anaemia after splenectomy, but of 17 animals which had had latent infections for three months and were then splenectomized only 11 died. It is evident then that latent infections produce some degree of immunity apart from splenic function. *D. H.*

MALARIA.

Précis of Abstracts in this Section.

Mirra (p. 488) describes malaria in Eritrea, where there are hyper-endemic areas. The majority are *vivax* infections. Soeiro and Rebelo (p. 488) found parasites (mainly *P. falciparum*) in 47·9 per cent. of natives and 5·7 per cent. of Europeans in 6,451 examinations in Lourenço Marques.

de Buck (p. 489) shows that *A. maculipennis messeae* and *atroparvus* are not sharply separated from one another according to the salinity of the breeding water, and van Thiel (p. 489) from experiments with *A. maculipennis messeae* and *atroparvus*, thinks that if the water in North Holland were rendered more fresh, *messeae* would not thereby displace *atroparvus*. Bevere (p. 490) finds *A. maculipennis labranchiae* the most prevalent anopheline in the Foggia province of Italy. Schlenova (p. 490) describes the habits of *A. maculipennis maculipennis*, the most important vector, *A. plumbeus*, *A. bifurcatus* and *A. superpictus* on the Black Sea coast. Danilova and Boudymko (p. 491) show that lagoons near the Sea of Azov are the most important breeding places in that endemic area. *A. maculipennis* is the principal vector; *P. vivax* infection is the commonest in summer and *P. falciparum* in autumn.

Evans (p. 492) shows that *A. maculatus*, the local vector in Pahang can breed inside jungle which, viewed from outside, is apparently safe.

Boyd and Kitchen (p. 492) found that when lots of *A. quadrimaculatus* were fed on patients, a significantly higher proportion of infection was obtained when exflagellation was found at the time of feeding, than when it could not be demonstrated, in *P. vivax* infections. No such difference was noted with *P. falciparum*.

Garnham (p. 492) considers that malaria stimulates a reticulo-endothelial response with phagocytosis of parasites in the placenta and that these macrophages are developed from lymphocytes. Relapses following parturition are probably due to removal, with the placenta, of a highly active reticulo-endothelial system. No instance of congenital infection was found in a large series.

Boyd *et al.* (p. 493) by experiments on reinfection found that simultaneous inoculation with two strains of *P. vivax* delays the development of homologous immunity to either. Sioli *et al.* (p. 494) describe the course of *P. vivax* infections with known strains. The Madagascar strain was more effective in producing infection in mosquitoes than the two others used, and did so even when gametocytes could not be found in the blood.

Boyd (p. 495) observed the density of *P. vivax*, in the blood of patients undergoing primary infections, in relation to the course of the clinical attacks. After trophozoite inoculation, maximum density was earlier and higher, and the attacks shorter, than after sporozoite infection.

Boyd and Kitchen (p. 495) report that 3 of 7 patients infected simultaneously with *P. falciparum* and *P. vivax* suffered relapses due to the latter. The primary attacks were characteristic of *P. falciparum* malaria. Hegner (p. 495) considers that the relative malignancy of *P. falciparum* (and *P. knowlesi*) may be due to the property of attacking mature erythrocytes rather than reticulocytes, which is not shown by *P. vivax*.

GERMAIN and MORVAN (p. 496) record a long latent period in a patient in whose blood at the first attack both *P. vivax* and *P. malariae* were found. JELINEK (p. 496) describes malaria with long latent period and in one case clinical features simulating cerebellar tumour. AUDEH (p. 497) considers that *vivax* malaria may have been the cause of orchitis in two patients. GASIC (p. 497) found no value in sternal puncture in the diagnosis of malaria during periods of latency.

FAIGUENBAUM and GASIC (p. 497) record the occurrence of agranulocytosis in a patient, apparently due to quinine treatment. BOYD and KITCHEN (p. 497) found that treatment with quinine for a single day had considerable effect in inducing periods of clinical quiescence in patients infected with *P. vivax*, especially if given late in the attack. No similar effect was found in *P. falciparum* infections.

DECOURT (p. 498) discusses the dysgonic action of quinacrine [atebrin]. This inhibits asexual reproduction and gamete formation of schizonts and suppresses morbid phenomena. For the maintenance of this action a dose of 0·3 gm. given thrice monthly is more effective than smaller doses given more frequently. FIELD *et al.* (p. 498) as a result of the treatment of a considerable number of patients with the three types of malaria, consider that atebrin musonate, though efficient in controlling acute attacks, is not to be recommended for routine administration.

CHOPRA *et al.* (p. 499) prefer plasmoquine to cilional in the eradication of gametocytes of *P. falciparum*. DE NUNNO (p. 500) from observations in induced malaria considers that antimony tartrate shows marked gametocidal properties and may be considered as a causal prophylactic.

BISPHAM (p. 500) working in an area with predominantly *P. vivax* infections, confirms the value of atebrin prophylaxis when 4½ grains weekly are administered for four weeks or more. CHARBONNIER (p. 501) found that in a post in French Indo-China although prophylactic quinine was not successful, the addition of quinacrine and praequine [plasmoquine] once weekly produced marked improvement.

MIRRA (Guido). Il problema malaria-colonizzazione in Eritrea. [**Malaria and Colonization in Eritrea.**]—*Ann. di Med. Nav. e Colon.* 1938. Sept.–Oct. Vol. 44. No. 9/10. pp. 428–436, 439–443.

This is a comprehensive description of Eritrea with special relation to conditions that are responsible for malaria endemicity. An account is given of the geographical divisions of the country, water courses, climate, rainfall, and population which numbers about 600,000, with five to the square kilometre. Breeding places of anophelines are described but no reference is made to species. Severe outbreaks of malaria in the past are referred to, as are the results of limited malaria surveys carried out during the past few years from which it appears that there are places in Eritrea in which malaria is hyperendemic. For the country as a whole about 75 per cent. of cases are *vivax* infections, 20 per cent. *falciparum*, and 5 per cent. *malariae*. *Norman White.*

SOEIRO (Alberto) & REBELO (Antonio). **Notes on the Epidemiology and Parasitology of Malaria (according to an Inquiry now proceeding in Lourenço Marques).**—*South African Med. Jl.* 1938. Nov. 26. Vol. 12. No. 22. pp. 841–847. [36 refs.]

The authors state that their work is based on 6,451 blood examinations in Lourenço Marques. Most of their paper, however, is concerned with

the published observations of other workers on such matters as the reasons for the rarity of *malariae* infections, the possible cycle of development of malaria parasites in the reticulo-endothelial system, multiplicity of strains of parasite with varying degrees of virulence, and other matters on which the authors' observations have little if any bearing. The blood films were obtained from persons in apparently good health. Parasites were found in 47·9 per cent. of films from natives and in 5·7 per cent. of films from Europeans. Upwards of 95 per cent. of infections discovered were *falciparum*. *P. tenue* was found; cases were rare; how many is not stated. Three cases of *P. ovale* infection were noted. The authors express a preference for the thin film method of examination. *N. W.*

DE BUCK (A.). Eine Lokaluntersuchung ueber das Brüten von Anophelen in Süss- und Brackwasser. [**Investigations on the Breeding of Anopheles in Fresh and Brackish Water in a Particular Locality.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 5. pp. 344–357. With 1 fig. French summary.

The author has studied the distribution of two races of *Anopheles maculipennis* (*atroparvus* and *messeae*) in one small region in Holland. In a part of his area the water is consistently fresh, in another part brackish.

The two races are not sharply separated from one another according to the salinity of the water. In the brackish water, contrary to expectation, 1 to 5 per cent. of the eggs are *messeae* and that race contributes about the same proportion to the adults in the stables in the neighbourhood; clearly, therefore, its females do not entirely refuse to lay their eggs in brackish water. In the fresh water, both races occur, either one or the other preponderating to the extent of 80 per cent. In those fresh waters, in which eggs and larvae of *messeae* are most numerous, larvae of *atroparvus* tend to die from an unknown cause. It appears, therefore, that the females of *atroparvus* frequently put the eggs in a water in which a high larval mortality will occur.

P. A. Buxton.

VAN THIEL (P. H.). Ueber das gemeinsame Vorkommen der Larven von *Anopheles maculipennis atroparvus* und *messeae* in Süsswasser. [**On the Joint Occurrence in Fresh Water of the Larvae of** *A. maculipennis* **Race** *atroparvus* **and Race** *messeae.*]—*Acta Leidensia* (*Scholae Med. Tropicae*). 1938. Vol. 12–13. pp. 271–278. With 1 plate. [Summarized in *Rev. Applied Entom.* Ser. B. 1939. Mar. Vol. 27. Pt. 3. pp. 50–51.]

"In Holland, malaria is confined to the province of North Holland, where *Anopheles maculipennis*, Mg., race *atroparvus*, van Thiel, breeds in brackish water; its transmission is largely due to the fact that the females of this race feed on man in autumn. In the non-malarial districts race *messeae*, Flni., breeds in fresh water, and it has been suggested that *messeae* would displace *atroparvus* if the water in the malarial districts were rendered more fresh. The author therefore carried out 29 experiments with mixed batches of newly hatched larvae of the two races in various proportions. The larvae were placed in tap water in dishes in three series, so that the surface areas per larva were 4, 6 and 15 sq. cm., respectively, but the percentage mortalities in the three series averaged only 15, 17 and 14. In no case did one race dominate the other, so that if the water in North Holland were rendered fresh, *messeae* would not thereby displace

atroparvus. The results of the experiments were judged by identifying the pupal cases, and the characters differentiating these in the two races are described, but the adults were bred out to make certain that the pupae were viable."

BEVERE (Lorenzo). Prime osservazioni sulla fauna anofelinica della Capitanata. [**Anopheline Fauna of Foggia Province, Italy.**]—*Riv. di Malariologia*. Sez. I. 1938. Vol. 17. No. 5. pp. 362–385. With 1 map. [24 refs.]

This report contains a vast amount of information about the diverse conditions found in 18 communes of the Foggia province as these relate to anopheline prevalence and malaria endemicity in each. The anophelines found were *maculipennis* var. *labranchiae, atroparvus, elutus* and *typicus, M. superpictus* and *A. pseudopictus* : *labranchiae* was much the most prevalent. A description is given of the climatic conditions, physical and chemical composition of the soil, hydrographic conditions with chemical composition of ground and surface waters, anopheline breeding places, agriculture, domestic animals, the density of the human population and the prevalence of malaria. Works of bonification that are being undertaken are also referred to ; these as yet are for the most part only in the initial stage. *N. W.*

SCHLENOVA (M. Th.). Sur la biologie des anophèles des environs de Sotchi. [**Biology of Anopheles in the Neighbourhood of Sotchi.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1938. Vol. 7. No. 4. [In Russian pp. 514–527. With 7 figs. French summary pp. 527–529.]

Sotchi is in the Caucasus on the coast of the Black Sea. Four species of Anopheles are found there, *maculipennis maculipennis, bifurcatus, plumbeus* and *superpictus*. The first named is the most prevalent and the most important vector of malaria.

The first male *maculipennis* was found on the 23rd of May and most females began to hibernate in October. This species breeds along the shingle-covered banks of little rivers, in artificial pools and irrigation and drainage canals. It is most prevalent in August. The physiological age of females was determined by the size of the ampulla of the oviduct. The curve illustrating the frequency distribution of these measurements is asymmetrical. The first oöcyst infected mosquitoes were in the class 0·007 mm^2 : the first sporozoite infected in the class 0·035 mm^2. The frequency of sporozoites increased with increase in size of the ampulla. Houses and stables serve as day resting places for *maculipennis*. Twenty per cent. of engorged females contained human blood. The oöcyst infection rate was 0·46 per cent. in July, 6·18 in August and 5·04 in September : the sporozoite rates in these three months were 2·10, 2·80 and 3·57. Sporozoites in September, for the most part, showed signs of degeneration. The sporozoite rates for *maculipennis* caught in houses and stables respectively were almost identical and there was no evidence that female *maculipennis* after egg-laying had any preference for shelters previously visited. Gonotrophic disharmony was observed in September and October but not in the summer.

A. plumbeus is second in importance as a vector. It breeds in hollows of trees, in depressions among the roots of trees and in empty

tubs. Its prevalence, dependent upon rainfall, was greatest in spring and autumn. Its daytime resting places were most commonly hollows of trees and trunks of trees in thick forest well protected from sunlight —dark and damp places. Houses are visited only at night or at dawn. The mosquitoes do not remain there during the day. They are found in greatest number at the edge of woods near human habitations. Female *plumbeus* only begins to display activity when the relative humidity is as high as 80 per cent. and its activity increases with further increase of humidity. At low temperatures with high humidity *A. plumbeus* attacks its victims with ferocity. It is strongly attracted by domestic animals but in a bathing resort the percentage of *plumbeus* containing human blood was considerable. This species will sometimes fly as far as 1·5 kilometres for its food. Of 282 females dissected two were infected.

Larvae of *A. bifurcatus* were found wherever there were pools fed by springs. Rare in summer, this species was prevalent in autumn and in spring; it dislikes heat. It has a marked partiality for the blood of domestic animals. Only 5 per cent. of engorged females contained human blood. Commonly found in stables no specimen was found in inhabited houses.

A. superpictus was found in very small numbers in houses and stables in the valley of the River Matsesta, the most southerly point of the coast of the Black Sea at which it has been found hitherto.

N. W.

Danilova (M. I.) & Boudymko (F. A.). Le rôle épidémiologique de l'*Anopheles maculipennis* Meig. et de l'*Anopheles hyrcanus* Pall. dans les lagunes de la mer d'Azov. [**Epidemiological Rôle of *A. maculipennis* and *A. hyrcanus* in the Lagoons of the Sea of Azov.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1938. Vol. 7. No. 4. [In Russian pp. 467–498. With 2 figs. [12 refs.] French summary pp. 498–500.]

Large expanses of water and a warm climate with high relative humidity are favourable to the propagation of anophelines near the Sea of Azov. Malaria is endemic. The lagoons are the most important breeding places of anophelines; they are very extensive and inaccessible to antilarval measures. The borders of these lagoons with dense submerged vegetation, reeds and rushes, harbour very large numbers of *maculipennis* larvae; *hyrcanus* breeds among the reeds. In the marshes anopheline breeding is limited. Artificial collections of water, though harbouring numerous larvae, are of little malarial importance; their extent is not great, especially in dry seasons. Similarly, provisional collections of water formed by the river Protoka may contain many larvae but they quickly dry and only yield one generation of anophelines each season. The potential vectors found were *A. maculipennis* var. *messeae* and *atroparvus*; *A. hyrcanus* var. *pseudopictus*, and *A. bifurcatus*. Localities near lagoons harbour more adult mosquitoes than do those near marshes or in the centre of the village; *A. hyrcanus* was never found in daylight resting places in the latter situations. *A. maculipennis* increases in numbers in June and reaches its maximum prevalence in July. *A. hyrcanus* appears in June and is most prevalent in the middle of August. Of *maculipennis* caught in dwelling houses the sporozoite index was 0·45 and the oöcyst index 0·22 per cent

Houses and stables are the favoured daylight resting places of *maculipennis*; thick clumps of rushes and reeds are those favoured by *hyrcanus*. The latter species enters houses, however, in numbers. *A. hyrcanus* is active in its natural shelters throughout the 24 hours; it generally feeds in the open air.

All three forms of malaria were found in the village of Grinevskaia; *vivax* infections are the most numerous at the end of summer; *falciparum* infections the most numerous in the autumn. Children and adults suffer in equal proportions. The authors' detailed and exhaustive investigations have led to the conclusion that *A. maculipennis* is the most important vector. *N. W.*

EVANS (T.). **An Outbreak of Malaria due to *A. maculatus* breeding inside Jungle at Raub, Pahang, 1937.**—*Jl. Malaya Branch Brit. Med. Assoc.* 1938. Sept. Vol. 2. No. 2. pp. 85–87. With 4 figs. on 2 plates.

The residential part of Raub is in close proximity to a belt of jungle. Malaria in Raub is carried by *A. maculatus*; *A. umbrosus* has never been found in the locality. Control by oiling stopped short at the jungle edge. Increase in malaria incidence was eventually found to be due to *A. maculatus* breeding in exposed areas inside the jungle. The appearance of the jungle viewed from outside gave a false sense of security. Attention to these breeding places was rapidly followed by decreased prevalence of malaria. *N. W.*

BOYD (Mark F.) & KITCHEN (S. F.). **Demonstrable Maturity of Gametocytes as a Factor in the Infection of Anophelines with *Plasmodium vivax* and *Plasmodium falciparum*.**—*Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 515–520.

This is a record of the degree of infection developing in lots of *A. quadrimaculatus* applied once to patients harbouring *vivax* or *falciparum* gametocytes, exflagellation preparations being made on the occasion of each infecting feed. There were 230 lots infected with *P. vivax* and 166 with *P. falciparum*. Not infrequently lots of mosquitoes were successfully infected when exflagellation was not demonstrated. The technique for demonstrating exflagellation was similar to that of SHUTE described by JAMES (this *Bulletin*, 1935, Vol. 32, p. 127). When exflagellation of *P. vivax* was observed, however, a significantly higher proportion of lots with an incidence of infection above 75 per cent. was obtained. Such a difference was not noted with *P. falciparum*. Exflagellation was more commonly noted in the spring and autumn than in summer and winter. This may be due to air temperature; in winter the wards are artificially heated. Mosquitoes applied during spring and autumn showed larger proportions with heavy infection than did mosquitoes applied at other seasons. High gametocyte counts in *falciparum* infections facilitate the detection of exflagellation. *N. W.*

GARNHAM (P. C. C.). **The Placenta in Malaria with Special Reference to Reticulo-Endothelial Immunity.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. June 25. Vol. 32. No. 1. pp. 13–34. With 2 charts & 8 figs. on 2 plates. [23 refs.] [Discussion pp. 35–48.]

In this paper the author gives an account of observations he has made on malarial infections of the placenta in 500 cases of pregnancy

in native women in Kenya. He has noted the very large number of parasites in all stages of development which may be found in the maternal blood spaces. This malarial infection stimulates a reticulo-endothelial response with phagocytosis of parasites similar to that which occurs in the spleen, liver and bone marrow in general malarial attacks. Though the reticulo-endothelial cells or macrophages occur in large numbers in the malarial placentas there appear to be no normal cells in the placenta to account for these. The author supposes that lymphocytes reach the placenta in the blood stream and, subjected to a malarial stimulus, proceed to multiply and develop into phagocytic macrophages, as is the case with the lymphocytes in the spleen. An attempt was made to stain the cells of the reticulo-endothelial system with trypan blue by giving to the mother intravenous injections of the drug. The dye was also transfused through the umbilical vein and applied to fresh smears of the placenta. In no case did the cells take up the blue dye, though it was shown to penetrate the trophoblastic lining of the villi, to stain the fibrocytes and reach the foetus, which was always stained blue. The macrophages, on the other hand, show a marked affinity for neutral red. The fact that the cells which are chiefly concerned in the malaria immunity process fail to stain with trypan blue suggests that it may be erroneous to assume that the specific cells can be blocked with this dye.

In a long series of observations on foetal bloods in cases of heavy placental infections it was not possible to demonstrate in a single instance the passage of parasites from mother to foetus.

It was assumed that the relapses which followed parturition were probably due to the sudden removal with the placenta of a highly active reticulo-endothelial system.

In the discussion which followed the reading of the paper speakers referred to the possible or probable influence of a specific immune substance on the macrophages, to the records of absorption of trypan blue by the somatic reticulo-endothelial cells and the indications that actual blockage thus took place, to the theory that the parasite of malignant tertian malaria reproduces normally by binary fission rather than by schizogony, to the possibility that the placenta with its malarial infection and macrophage response was actually an extra-corporeal depôt which exerted no influence on the general immune processes of the body, which were carried on by the spleen as had been the case before the development of the placenta.

The author of the paper finally replied to the various questions raised.

The whole paper, which is illustrated by microphotographs, is the most comprehensive one which has appeared on the subject of the behaviour of the placenta in cases of malignant tertian malarial infection. *C. M. Wenyon.*

Boyd (Mark F.), Kupper (W. H.) & Matthews (Choice B.). **A Deficient Homologous Immunity following Simultaneous Inoculation with Two Strains of** *Plasmodium vivax.*—*Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 521–524.

The authors have previously shown that patients successfully inoculated with a strain of *P. vivax* develop an immunity which renders them either entirely refractory to reinoculation with that

strain or, if successfully reinoculated, they have no clinical manifestations of infection. The present paper records the results of inoculating three patients each with approximately equal numbers of trophozoites of two strains of *P. vivax*, intravenously. After varying intervals following the spontaneous or induced termination of the resultant mixed attacks the patients were successively reinoculated with trophozoites of each strain alone. Five of these six reinoculations were followed by short clinical attacks. The primary attacks did not proceed to spontaneous termination but their duration was 58, 89 and 23 days respectively. It appears that the simultaneous presence of two strains delays the development of homologous immunity to either.

N. W.

SIOLI (F.), KENTENICH (A.) & BOLDT (Erika). Weitere Erfahrungen ueber die Zucht der Anopheles und ihre Verwendung in der Malariabehandlung der Paralytiker. [**Further Experience in the Breeding of Mosquitoes and their Use in Therapeutic Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1939. Jan. Vol. 43. No. 1. pp. 1–15. With 10 figs.

In the experiments described in this paper, local mosquitoes; species not mentioned, were used for infective purposes. Various improvements in technique are mentioned since the last report in 1936, regarding moisture content of air and use of glass windows in mosquito cages. A certain type of rabbit is used to provide blood meals in the cages and a current of air, against which mosquitoes cannot fly, is of service during its removal. Rubber gloves are worn by the operator.

Besides the curative action of induced malaria in G.P.I. patients, the disease, when caused by mosquitoes, provides useful material for the study of new drugs. Three strains of benign tertian parasites have been used: i. the Original Viennese strain, ii. a Rumanian, and iii. the Madagascar strain, the latter two having been sent from England. The experiments described deal with the last strain, which has not altered its character by passage through human beings and mosquitoes in turn. Thirty-one patients were successfully inoculated out of thirty-three attempts. In one case a single mosquito caused infection. The incubation period varied from 10–22 days. There was no relation between the number of bites and incubation time or in the character of the infection. A pure tertian type of fever was rare and generally alternated with quotidian. In ten out of 31 cases the fever subsided spontaneously, six of the 10 patients having been previously inoculated. All the patients had a temperature of 104° or over. In 14 cases parasites were noted before the appearance of fever, in seven others the appearance of parasites and fever coincided, and in a further seven cases parasites appeared after onset of fever. In twenty-one cases gametocytes were detected 6–20 days after the start of fever, while in the remaining 10 cases they were absent, and this was so where fever disappeared without treatment.

Atebrin in $3 \times 0{\cdot}1$ gm. doses for 7 days and 8 days later in $3 \times 0{\cdot}1$ gm. doses for 4 days, was used in treatment. Quinine in 0·2 gm. doses was found useful in causing abatement of fever.

Regarding mosquitoes, the Madagascar strain gave rise to a higher percentage of, and more intense infections than, the others. Even in cases where the patient's blood failed to show the presence of gametocytes, infection in fed mosquitoes resulted. Details are given of the

work of the clinic in supplying infected blood, and the apparent influence of blood withdrawal on temperature and duration of fever, as well as on parasite counts is discussed. *J. D. Fulton.*

BOYD (Mark F.). **The Threshold of Parasite Density in Relation to Clinical Activity in Primary Infections with** *Plasmodium vivax.*—*Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 497–503.

The observations recorded were made on 77 cases of *vivax* malaria, mostly of the McCoy strain, in 56 of which infection was naturally induced (sporozoites), the remainder being infected by the injection of trophozoites. No elevation of temperature that failed to attain 100°F. (37·8°C.) was regarded as significant of malaria infection. A clinical reaction may be induced by *P. vivax* in densities in the peripheral blood of 10 per cmm. or less, whatever the method of infection. Excepting the few days subsequent to the onset, the duration of the clinical attack never exceeded the period during which the parasite density remained at 100 or more per cmm.; generally it was shorter in duration. Parasite densities in excess of 25,000 were uncommon; a count as high as 50,000 was exceptionally rare. Densities above 25,000 were more common following trophozoite inoculation than in natural infection. After trophozoite inoculation the maximum density was usually observed within 10 days of the first detection of parasites; after sporozoite inoculation it occurred later. Counts in excess of 15,000 were most often observed in cases that ran for four weeks or longer. Attacks following trophozoite inoculation terminated with higher parasite counts than did sporozoite induced attacks. Rarely were counts of 500 or less observed at the termination of the clinical attack. The final density bears no relation to the density which provoked the original clinical reaction. That attacks induced by trophozoite inoculation are commonly shorter than sporozoite induced attacks may be due to more rapid immunization by reason of higher parasite densities. *N. W.*

BOYD (Mark F.) & KITCHEN (S. F.). **Vernal Vivax Activity in Persons simultaneously inoculated with** *Plasmodium vivax* **and** *Plasmodium falciparum.* *Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 505–514. With 5 charts.

The authors recently reported the successful inoculation of patients with *P. vivax* and *P. falciparum* simultaneously by multiple infected mosquitoes (see this *Bulletin*, 1938, Vol. 35, pp. 424–5). The present paper deals with the subsequent malaria history of these patients. Three of the seven cases, in all of whom the initial attack was characteristic of *falciparum*, had clinical attacks of malaria attributable to *P. vivax*, in the following winter or spring. This renewed activity occurred 235, 236, and 282 days respectively after the onset of the original attack, or 226, 174 and 233 days after its induced termination. *N. W.*

HEGNER (Robert). **Relative Frequency of Ring-Stage Plasmodia in Reticulocytes and Mature Erythrocytes in Man and Monkey.**—*Amer. Jl. Hyg.* 1938. May. Vol. 27. No. 3. pp. 690–718. With 20 coloured figs. on 1 plate. [55 refs.]

By examining blood films containing the three common malarial parasites of man the author has studied the relative frequency of

infection of mature erythrocytes and reticulocytes by the newly formed merozoites. Similar observations were made from monkeys' blood containing *P. knowlesi*. The films were made at the time of schizogony of the parasite and were stained with brilliant cresyl blue. It was found that the merozoites of *P. vivax* had a special affinity for the reticulocytes, whereas those of *P. falciparum* and *P. knowlesi* preferred the mature erythrocytes. It is concluded that the last two parasites owe their malignancy to this property of attacking mature erythrocytes rather than reticulocytes as well as to the rapidity of their multiplication. Though *P. malariae* also shows a predilection for mature reticulocytes its slow rate of multiplication renders it less malignant. An interesting point was noted in the case of *P. vivax*. The reticulocytes, which form the bulk of the cells infected by the young rings, are larger than the mature erythrocytes, so much so that the author is inclined to believe that the conception that the cell infected with *P. vivax* increases its size after infection is erroneous. The cells containing the larger parasites and gametocytes are hardly, if at all, larger than the newly infected reticulocytes. It appears to the author that certain characters of the parasites considered may be accounted for by their varying affinities for mature erythrocytes and reticulocytes. The paper is illustrated by a coloured plate depicting the types of cell infected. *C. M. W.*

GERMAIN (A.) & MORVAN (A.). Nouveau cas de paludisme à incubation prolongée. [**Case of Malaria with Prolonged Incubation Period.**]—*Bull. Soc. Path. Exot.* 1938. Oct. 12. Vol. 31. No. 8. pp. 713–716.

This case of malaria with a prolonged incubation period is of interest inasmuch as it concerns a mixed infection, *vivax* and *malariae*. A sailor on a gunboat on the Upper Yangtse, in which he had had two years service, left the Yangtse in the middle of February. He returned to France on leave *via* Saigon, where he spent four days. He arrived in France in the middle of March. During his Far Eastern service he had never been ill and had never taken quinine prophylactically. In France he spent three months in the Indre and Loire district, where there is no malaria. On the 26th of June he was taken ill with malaria, a typical attack. Parasites of both *vivax* and *malariae* were found in the blood. The authors are inclined to think that infection was acquired in the Yangtse Valley, which he had left four and a half months previously. It is unlikely that he acquired a *malariae* infection in Saigon : quartan fever is rare there but not uncommon in the Upper Yangtse Valley. *N. W.*

JELINEK (A.). Ein Beitrag zur Pathogenese der Malaria. Malariakomplikation unter dem Bilde eines Kleinhirntumors. [**Pathogenesis of Malaria : Malaria producing the Clinical Features of a Cerebellar Tumour.**]—*Med. Klin.* 1938. Dec. 30. Vol. 34. No. 52 (1775). pp. 1711–1713.

Two cases of benign tertian malaria which occurred in Southern Slovakia are described. In both the incubation period was very prolonged, in one case six months, in the other eight months at least. The latter case had interesting complications in the nervous system ; the clinical features pointed strongly to the presence of a cerebellar

tumour. The patient had ataxia, fainting, hypotonia, headache, vomiting, double papilloedema and bradycardia. The author considers that these manifestations were produced by the malarial infection causing a thrombosis of a cerebral vein which produced the pressure symptoms and at the same time perivascular haemorrhages occurred in the cerebellum itself. *E. D. W. Greig.*

AUDEH (A.). **Does Benign Tertian Malaria cause Orchitis ?**—*Jl. Egyptian Med. Assoc.* 1938. Oct. Vol. 21. No. 10. pp. 672–677.

A description of two cases, one a boy of 12, the other a man of 28 years of age, both of whom developed acute orchitis concurrently with acute attacks of *vivax* malaria. The author discusses the common causes of orchitis, none of which were apparently operative in either case. *N. W.*

GASIC (Gabriel). La exploración parasitaria de la médula ósea en el curso del paludismo crónico. [**Exploration of the Bone Marrow in Chronic Malaria.**]—*Rev. Chilena de Hig. y Med. Preventiva.* 1938. July–Sept. Vol. 1. No. 7–9. pp. 385–392.

The author describes fully twelve cases of chronic malaria in which sternal puncture was performed to determine the value of the procedure in the diagnosis of malaria during periods of latency. He arrived at the conclusion that the method has no practical value, and that malaria parasites do not shelter in bone-marrow during such latent periods. *N. W.*

FAIGUENBAUM (Jacobo) & GASIC (Gabriel). Agranulocitosis por quinina. [**Agranulocytosis due to Quinine.**]—*Rev. Chilena de Hig. y Med. Preventiva.* 1938. July–Sept. Vol. 1. No. 7–9. pp. 397–402.

This paper describes the appearance of clinical and haematological signs of agranulocytosis in a patient suffering from chronic *falciparum* malaria, who was being treated with quinine, atebrin and plasmoquine. There were necrotic patches on the gums and at the level of the tonsils. The neutrophil leucocytes fell to 2 per cent. The condition lasted five days. He was treated with small doses of adrenalin intravenously and "Cantan." Recovery was complete. Thirty days later a small dose of quinine caused a slight return of symptoms, the neutrophil leucocytes falling from about 48 to 8 per cent. The administration of atebrin and plasmoquine in this case caused no alteration of the leucocyte formula. *N. W.*

BOYD (Mark F.) & KITCHEN (S. F.). **The Effect of Small Amounts of Quinine administered on a Single Day on the Subsequent Course of Infections with *Plasmodium vivax* and *Plasmodium falciparum*.**—*Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 525–530.

The observations recorded were on patients in the Florida State Hospital undergoing malaria therapy. The interruption of infection is commonly indicated. In *falciparum* infections the control of the evolution of infection is commonly required, and often early in the attack. The interruption of *vivax* infections is generally called for by some organic condition of the patient and may occur at any time during the course of the malaria attack but generally at a later period than in

falciparum infections. In this report only patients who received quinine on a single day, in one or in divided doses, are considered. Quinine sulphate in capsules was given. A single dose of 20 grains of quinine had very little effect on the strains of *falciparum* studied; a dose of 11 grains or more exercised very decided action on the McCoy strain of *vivax*. The effect was more evident if the acute attack of malaria had lasted eight days or more when the dose of quinine was given. Single doses of 11 grains or more suppressed paroxysms and induced periods of clinical quiescence, of varying duration, in the large majority of *vivax* cases. A declining trend in parasite density which lasted several days was also noted. Nothing comparable in *falciparum* infections was noted even after a dose of 20 grains. *N. W.*

DECOURT (Ph.). La lutte antiplasmodiale. Ses bases pharmacodynamiques. [**Pharmaco-Dynamic Bases of Antiplasmodial Measures.**]—*Bull. Soc. Path. Exot.* 1938. Oct. 12. Vol. 31. No. 8. pp. 760–771. With 4 charts.

The mode of action of anti-malarial drugs is complex. They exercise in varying degrees schizonticidal, gametocidal and antisporogonic activities. The last named prevents the fertilization of gametes in the mosquito. In addition to these the author describes a dysgonic action, a conception that is both parasitological and clinical. Under the influence of this action schizonts lose almost entirely their powers of asexual reproduction and gamete formation. From the clinical point of view this action is manifested by the absence of morbid phenomena in spite of the presence of schizonts, sometimes numerous, in the blood. It is the dysgonic action of quinacrine which engages the attention of the author. The total dose of quinacrine necessary to produce this action, at the beginning of treatment, is variable, depending as it does upon a parasitic factor and an organic factor. The optimum dose necessary to sustain this activity, once it is established, is remarkably constant; it approximates 0·25 gm. for an adult. Dysgonic action lasts about three weeks but during this time it weakens progressively. If the parasite is but little aggressive a dose taken twice a month will be sufficient to prevent all morbid phenomena. More frequent administration is necessary if the parasite is aggressive, the patient's resistance low, and if reinfections are numerous.

The mere presence of quinacrine in the blood is insufficient to explain dysgonic action. A very small dose given daily is much less potent in this respect than the optimum dose given at much longer intervals although the total amount of the drug given by the former method may be greater. Thus a dose of 0·1 gm. given on 3 or 4 days in the week is less effective than one of 0·3 gm. given three times a month. The duration of this dysgonic action is not appreciably prolonged by increasing the optimum dose, even by large amounts. There is no relationship between the curve of dysgonic action and that of the concentration of the drug in the blood or tissues. *N. W.*

FIELD (J. W.), NIVEN (J. C.) & GUEST (C.). **Clinical and Experimental Observations on Atebrin Musonat. With a Note by** F. E. BYRON.—*Bull. Inst. Med. Res. Federated Malay States.* 1937. No. 2. 24 pp. With 10 graphs. [12 refs.]

The object of the observations recorded was to compare the therapeutic value of atebrin musonate with that of quinine bihydrochloride

in the treatment of acute malaria. The patients were Malay, Indian and Chinese adults admitted to hospital. They were allotted to the atebrin musonate or quinine group alternately, the only patients excluded from one or other of these experimental groups being afebrile cases, patients with but few parasites in the peripheral blood, mixed infections, or cases with a history of malarial treatment during the preceding three days. The minimum period of observation from the beginning of treatment was one week. Forming the atebrin musonate group were 284 patients, 187 *falciparum*, 84 *vivax* and 13 *malariae*. In the quinine group were 271 cases, 184 *falciparum*, 77 *vivax* and 10 *malariae*. The daily dose of quinine given was either one or two grams per 100 lbs. body weight for 7 days; 29 *falciparum* cases received quinine intramuscularly for 2 days followed by 5 days oral treatment. The remaining quinine cases received the drug by mouth. The doses of atebrin musonate varied from 0·2 gm. a day for two days to 0·3 gm. a day for 3 days; some cases received 0·4 gm. a day for 2 days. The atebrin musonate was given intramuscularly except in 34 *falciparum* cases which received intravenous injections.

At the recommended dose of two injections of 0·3 gm. atebrin musonate efficiently controls an acute attack of any kind of malaria; it is a slightly more potent therapeutic agent than oral quinine. Trophozoites disappeared from the peripheral blood and temperatures fell somewhat earlier in the cases treated with atebrin musonate; this was most marked in *vivax* infections. As a *falciparum* gametocide atebrin musonate has no advantage over quinine. It was not possible to obtain accurate data of relapse rates; it appeared that two injections of atebrin musonate without supplementary treatment are not sufficient to effect a permanent cure. The authors consider 0·375 gm. to be the optimum daily dose of atebrin musonate; given on two successive days this dose controls an acute attack of malaria. Intramuscular administration is the method of choice. As far as local reaction is concerned this drug compares favourably with any other malarial remedy given intramuscularly. Three patients treated with atebrin musonate displayed alarming symptoms of nervous disturbance. One of these was very anaemic; the drug is contra-indicated in such cases. The symptoms were temporary in all three cases and followed by no permanent effects.

Five hundred samples of urine from both groups were examined; the urobilinuria associated with atebrin musonate treatment is not more marked than that associated with quinine treatment.

The conclusion is reached that in spite of its efficacy in controlling acute attacks of malaria the routine administration of atebrin musonate is not advisable. Oral therapy is the method of choice in the majority of cases [see also this *Bulletin*, 1935, Vol. 32, p. 746; 1936, Vol. 33, pp. 231, 274, 275; 1937, Vol. 34, p. 776]. *N. W.*

CHOPRA (R. N.), DAS GUPTA (B. M.) & SEN (B.). **Studies on the Action of Synthetic Antimalarial Drugs on Indian Strains of Malaria. Cilional in the Treatment of "Crescent Carriers."** —*Indian Med. Gaz.* 1938. Nov. Vol. 73. No. 11. pp. 667–669.

This paper describes the treatment with cilional of four patients harbouring *falciparum* gametocytes. The authors found that a total dose of 0·35 to 0·4 gm., administered in doses of 0·03 gm. three times a day, is usually sufficient to eradicate gametocytes of *P. falciparum*.

No ill effects were noted. In spite of this, however, the conclusion is reached that plasmoquine is preferable to cilional; a much smaller dose of the former is effective (0·02 gm. daily for three days). Such small doses of plasmoquine are not at all toxic. *N. W.*

DE NUNNO (Renato). Azione del tartaro stibiato sui gametociti del *Plasmodium vivax* e del *Pl. falciparum.* Ricerche sperimentali. [**Experimental Research on the Action of Antimony Tartrate on Gametocytes of** *P. vivax* **and** *P. falciparum.*]—*Riforma Med.* 1938. Oct. 22. Vol. 54. No. 42. pp. 1599–1601. With 2 figs.

Sixty persons were inoculated with the blood taken from a patient infected with *P. vivax*, at the height of a febrile attack, before the appearance of gametocytes. In two cases infection failed to materialize. Of the 58 successfully infected 6 received no treatment, 12 were treated with quinine, and 40 were treated with antimony tartrate. Bisulphate of quinine was given in the following doses, 1·5 gm. a day for the first week, 1 gm. a day for the second week, and 0·5 gm. a day for the third week. The antimony tartrate, a 1 per cent. solution in distilled water, was administered intravenously, on alternate days, beginning with a dose of from 6 to 10 cc. according to the general condition of the patient, increased by 2 cc. to a maximum of 14 cc. The total amount received by each patient was from 120 to 200 cc. The number of patients in whose blood gametocytes developed were: 4 of the 6 untreated controls, 66·6 per cent.; 7 of the 12 treated with quinine, 58·3 per cent.; 4 of the 40 treated with antimony tartrate, 10 per cent.

In another series of observations four patients harbouring *falciparum* gametocytes and 5 patients harbouring *vivax* gametocytes were treated with quinine. Eight patients harbouring *falciparum* gametocytes, and 20 harbouring *vivax* gametocytes were treated with antimony tartrate. In the quinine treated cases the gametocytes decreased in numbers very slowly and the persistent gametocytes retained their normal morphology and staining characteristics. In the antimony treated cases the *vivax* gametocytes had disappeared from most of the cases after they had received 10 to 20 cc., and the *falciparum* gametocytes after aggregate doses of from 21 to 40 cc. Even with smaller doses the gametocytes of both species lose their normal appearance; their contour becomes irregular, there is vacuolation of the protoplasm, dislocation of pigment, loss of colourability of chromatin and protoplasm, and fragmentation. Antimony treatment also produces a marked diminution of splenomegaly. The author concludes that after small doses of antimony tartrate the patient loses the power of infecting anophelines and that the drug may be considered as a causal prophylactic. *N. W.*

BISPHAM (William N.). **Final Report on the Use of Atabrine in the Prophylaxis and Treatment of Malaria.**—*Amer. Jl. Trop. Med.* 1938. Sept. Vol. 18. No. 5. pp. 545–564.

The author has previously reported good results from the use of atebrin in the control of malaria in Civilian Conservation Corps Camps in the Southern States (see this *Bulletin*, 1937, Vol. 34, p. 218). His final report confirms opinions previously expressed. The personnel of every camp with an admission rate for malaria of two or more cases in a week were given a prophylactic dose of 4½ grains of atebrin a week

for four weeks ; this period was extended if the number of cases still exceeded one a week. The vast majority of cases were *vivax* infections. The author concludes that if atebrin be used as a prophylactic under supervision, men of susceptible age can live and carry on their various occupations in a highly infected area with a minimum of malarial infection and a maximum of effectiveness. Over 90 per cent. of *vivax* carriers can be cleared of all parasites. Untoward reactions to atebrin are " almost never encountered, and when encountered are of a transient character." *N. W.*

CHARBONNIER. Emploi des médicaments synthétiques antipalustres au poste de Muong-Boum. [**Use of Anti-Malaria Synthetic Drugs in a Military Post.**]—*Ann. de Méd. et de Pharm. Colon.* 1938. July–Aug.–Sept. Vol. 36. No. 3. pp. 732–734.

In spite of the regular administration of prophylactic quinine the post of Muong-Boum has year after year suffered from very severe malaria during the hot weather months. From June to September 1937 inclusive the issue of quinine was reinforced by the administration to each member of the garrison, every Sunday, of quinacrine 0·2 gm. and praequine 0·02 gm. There was a consequent marked improvement in the health conditions. There were no serious cases of malaria. Neighbouring posts, which were not so treated, suffered that year as severely as usual. *N. W.*

MISCELLANEOUS.

TROLLI (G.). Paraplégie spastique epidémique. " Konzo " des indigènes du Kwango d'après les médecins du Fonds Reine Elisabeth, pour l'assistance médicale aux Indigènes. [**" Konzo," Epidemic Spastic Paraplegia of the Congo.**]—pp. 1–34. With 1 map. 1938. Brussels : Fonds Reine Elisabeth pour l'Assistance Médicale aux Indigènes du Congo Belge, 112 rue du Commerce.

The disease here described bears resemblances in several respects to the A and B avitaminosis of Nigeria and the " central neuritis " of Jamaica [see this *Bulletin*, 1919, Vol. 13, p. 372 ; 1936, Vol. 33, p. 887, 889, 893 ; also *Bulletin of Hygiene*, 1929, Vol. 4, p. 391 ; 1933, Vol. 8, p. 441 ; 1934, Vol. 9, p. 487].

The condition which is known locally by the name " konzo " attacks chiefly children below 10 years of age, but adults also suffer. The onset is usually, not always, abrupt with pain in head and back, paraesthesiae, formication, and a sense of constriction in limbs and back, and paresis to paralysis, at first flaccid, later (and occasionally from the outset) spastic ; there is muscular atrophy. There are in some cases disturbances of speech and of sight to actual blindness. It is rarely fatal, but the sequelae are permanent.

The disease was first described in 1936 among the inhabitants of the Kwango district of the Belgian Congo. The population is sparse and largely nomadic ; their diet seems to be very varied, nothing being refused, from ground nuts, fungi and sugar cane to ants, caterpillars, rats, monkeys, and palm oil. They also cultivate cassava, sweet potato and millet. It is recorded that they do not suffer from

poverty and destitution and that the less well-to-do are less subject to the affection described than those better off. Diagnosis is discussed; beriberi is ruled out for the condition is largely spastic, at all events in the later stages, and cardiac complications are not met with; other suggestions are acute anterior poliomyelitis and lathyrism. It is not uncommon for several members of a family to be attacked. Examination of the blood and of the spinal fluid revealed nothing of moment. The result of further study will be awaited with interest.

H. H. S.

CORKILL (N. L.). **Tropical Ulcer: Observations on its Treatment and Cause.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1939. Jan. 28. Vol. 32. No. 4. pp. 519–532. With 3 graphs. [17 refs.]

A study of 94 completed treatments of tropical ulcer in the Nuba Mountains area of Southern Kordofan with a discussion of the aetiology.

The Report of the Sudan Medical Service for 1936 showed that after venereal diseases and trauma tropical ulcer ranked next to malaria as a cause of invalidity. The present study deals with patients, Nubas and Arabs, admitted to three hospitals in the course of three years. Two forms of treatment are analysed: (A) by codliver oil locally and vitamin A concentrate (Essogen) by mouth; (B) any other local treatment and no vitamin, the respective recipients in completed cases numbering 49 and 45. The two groups are again divided into old and recent, the old being those with a six months' history or recurrences. Analysis of the results shows that though there was little difference between (A) and (B) in recent cases, in the old, or chronic, cases there was in (A) compared with (B), an increase of 64 per cent. in the healing rate, due to codliver oil or vitamin A concentrate or both.

The author writes:—

"Cod-liver oil appears to be an excellent routine dressing for all skin injuries for it is comfortable and popular, and in recent lesions has a healing rate comparable with the average of pooled other treatments. In old and recurrent ulcers and those in which the destructive phase has ceased, it is the treatment of election for it favours or causes rapid epithelialization with a minimum of scarring. It is perhaps more costly, though perhaps not importantly so, for the time spent in hospital is reduced, and recurrence is less likely as the ulcer heals by epithelialization rather than by scar tissue."

A graph shows the temperature throughout the year, admissions for tropical ulcer, onsets, recurrences, and origin by vesicle. The last three have a peak in May, whereas the peak of admissions is in August; the May peak is, he says, the annual acme of vitamin deficiency coupled with the hard labour of preparing and sowing the land under cultivation. The patients do not come for treatment till this period is over. The vesicle or papule he believes to be a tissue necrosis in a person in a state of malnutrition. He discusses the influence of diet and season. The Sudanese diets are mainly carbohydrate, and poor in protein and for six months in the year (period of intense dryness) deficient in vitamins A, B_2 and C. Another graph shows the healing rate (mm. per day) in relation to malaria and green grazing and a third the effect of malnutrition which is more pronounced in old, recurrent, cases.

The author advises the administration of skim milk powder as a dietetic supplement but does not appear to have tried it.

A. G. Bagshawe.

ROY (B. M.). **Cod-Liver Oil Treatment of a Carbuncle and Two Ulcers.**—*Indian Med. Gaz.* 1939. Feb. Vol. 74. No. 2. pp. 93–94. With 3 figs.

Cod liver oil, changed twice daily for about one week, and thereafter once daily, was used as a dressing for one large carbuncle and two ulcers of the leg. Complete healing took place in under three weeks in every case, although one of the ulcers had been present for a year. No other treatment except quinine was given. Photographs show that the ulcers were of the usual extensive necrotic type, and the carbuncle massive, and it is stated that the patients asked for the oily dressing. This method is painless, efficient and cheap. *C. W.*

LASSMAN (P.). Note préliminaire sur le traitement des ulcères tropicaux avec le sulfanilamide. [**Treatment of Tropical Ulcer with Sulphanilamide.**]—*Ann. Soc. Belge de Méd. Trop.* 1938. Dec. 31. Vol. 18. No. 4. pp. 581–583.

The author noted that ulcers in patients treated for various illnesses with Astreptine, a sulphanilamide preparation, healed with remarkable speed. He therefore treated 10 patients who had been in hospital with tropical ulcer for periods of from 3 to 13 months, by the administration of 5 tablets, each of 0·3 gm., four times daily. The ulcers rapidly showed healthy granulations and at the end of 3 weeks all were completely healed and the patients had left hospital.

In confirmation, a further series of 30 patients with ulcers, chosen by the alternate case method, were so treated and the results compared with those of the 30 alternate controls treated by the usual methods. The sulphanilamide group showed 313 hospital days, average 10, and were all cured. The controls showed 565 hospital days, average 18, and one was still under treatment at the end. Only one patient had ill effects, with skin eruption and temperature of 40°C. These cleared up on stopping the treatment. *C. W.*

HULSHOFF (A. A.). Klierkoorts. [**Glandular Fever.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. Oct. 11. Vol. 78. No. 41. pp. 2514–2524. With 3 charts & 1 fig.

The cases of two patients formed the subject of this clinical lecture. The first was clearly one of true glandular fever, the second had up to a time all the appearance of a true case and was on the point of being discharged from hospital when he developed a definite attack of malaria with ring forms in the blood.

The blood picture in all types of glandular fever is very characteristic with its relative and absolute mononucleosis in which there are present more large than small lymphocytes, and many lymphocytes with polymorphic nuclei—kidney shaped, lobed and Rieder type. There are lymphocytes resembling monocytes, lymphocytes with intensely blue, sometimes vacuolated, cytoplasm and lymphocytes resembling plasma cells. It is extremely difficult to give a name to the types present and they are often recorded simply as "abnormal lymphocytes." It is this very varied lymphocytic picture which distinguishes glandular fever from lymphatic leukaemia, in which the lymphocytes are of very uniform type and in relatively greater number. The first of the two patients had the glandular swellings, the blood picture and the heterologous serum agglutination reaction (1–512) to sheep erythrocytes of glandular fever and, as there were no throat symptoms

complained of, was diagnosed as of septic type. The second case was specially interesting because, in spite of almost the same set of symptoms, the patient who had been examined for malaria with negative results ultimately did develop malaria tropica and was cured with a quinine-plasmoquine course of treatment.

The author concludes with the remarks :—" We learn thus from these two cases : (1) how difficult, even by very careful expert examination, the diagnosis of malaria tropica can be ; (2) how neither clinical data, nor blood examination, nor serum test are absolutely diagnostic of glandular fever." *W. F. Harvey.*

i. KUBO (Michio) & BABA (Hiroshi). **Studies on the Cause of the Endemic Dermatitis in Manchoukuo. (First Report.)**—*Jl. Oriental Med.* 1938. Oct. Spec. No. [In Japanese pp. 1189–1193. With 1 fig. [11 refs.] English summary pp. 173–174.]

ii. ——, —— & GOMI (Tadakatsu). **Studies on the Cause of the Endemic Dermatitis in Manchoukuo. (Second Report.)**—*Ibid.* [In Japanese pp. 1195–1202. With 4 figs. & 4 plates. English summary pp. 175–176.] [Summary appears also in *Bulletin of Hygiene.*]

i. Dermatitis is a troublesome condition well known among workers in the rice-fields of Manchoukuo, and particularly in July and August. It affects only the legs and arms—parts which are immersed in the irrigation water. The symptoms are intense itching followed by a papular erythematous rash, occasionally becoming vesicular and later eczematous. In the early stage it is very suggestive of ground-itch from hookworm larvae or that set up by schistosome cercariae. Examination, however, failed to detect either of these, but a number of mites belonging either to the Pediculoidinae or the Tyroglyphidae were present. The authors describe the mite. The local lesions are very like those of " grocers' itch," or the " water itch " among Assam tea-plantation workers due to *Rhizoglyphus parasiticus*, or the " vanillism " among those handling vanilla, or lastly " copra itch," due to *Tyroglyphus longior.*

ii. In this are recorded the results of experimental work to elucidate the cause of the dermatitis. First, mites were collected by filtration of the infested water. Four species were obtained and each was tested. One belonging to the Tyroglyphidae when applied to the skin of a volunteer produced a miliary papular rash ; the others did not. Next the legs of volunteers were immersed in water containing grasses and rice plants, the plants being taken, washed in well-water, and applied in more of the same well-water. Thirdly, the suspected irrigation rice-field water was similarly tested on volunteers, after the water had been filtered. In both these experiments the results were negative. Finally, in a stream flowing through the infested area 25 boys stood with legs immersed, and 24 of them developed the dermatitis. Then, more similarly stood in the water after the mites had been filtered off, and none was affected, but when the filtrate was added to water immersion resulted in the production of the dermatitis. The lesions are, therefore, due not to chemical irritants in the water nor to grasses and plants but to the mite, belonging to the Tyroglyphidae. The actual species has not yet been determined.

H. H. S.

RAGAZZI (Giorgio). Il clorulo etile nella terapia medica della *Sarcopsylla penetrans.* [**Ethyl Chloride in the Treatment of** *Tunga penetrans.*]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1938. July. Vol. 19. No. 7. pp. 437–438.

The author treated a patient, whose feet were deformed by literally hundreds of chiggers, by spraying the great toe with ethyl chloride. This was so successful that a moderate spray was applied to the whole foot, which was then bandaged and the treatment was repeated on alternate days. The patient was cured in a week.

The dose for a single chigger is about 2 cc. and bandaging is not necessary. The effect is probably due to toxic action rather than to freezing, and this treatment is particularly useful for children.

C. W.

WANG (Lo-shan). **The Action of Paipu,** *Stemona tuberosa* **on Lice.**—*Chinese Med. Jl.* 1938. Aug. Vol. 54. No. 2. pp. 151–158.

The author describes tests on paipu, a Chinese drug which may be used for killing lice.

A watery extract of the plant paipu (*Stemona tuberosa*) has been used for centuries in China as an insecticide. The crude drug may be obtained from Chinese pharmacists.

The author says that 70 per cent. alcohol only kills lice if they are immersed for periods of over two hours. He then tests extracts of the crude drug made in alcohol of this strength, and finds that if 10 per cent. of the drug is soaked in alcohol for three days body lice (*Pediculus humanus*) generally die after being dipped for three minutes. At higher concentrations the liquid kills on even shorter exposures, though many of the lice survive for a day or two ; nits may be killed readily by the same solutions. Watery extracts, however, are much less efficacious. The alcohol extracts were tested on infested people and gave satisfactory results, and it appears that the solution is not irritant. The exact action of the drug is unknown. *P. A. Buxton.*

CAUSEY (O. R.). **Experimental Intestinal Myiasis.**—*Amer. Jl. Hyg.* 1938. Nov. Vol. 28. No. 3. pp. 481–486.

PATTON and EVANS in 1929 stated that eggs of Calliphorinae when ingested by man probably would not hatch and larvae ingested would fail to develop. HERMS and GILBERT in 1933 described a case of intestinal myiasis caused by larvae of Lucilia, Calliphora and Sarcophaga which they thought persisted for years ; CHANDLER in 1936 gave as his opinion that some species of flies which develop as larvae in the faeces of man or animals may live and grow in the intestine. Others, however, maintain that the presence of larvae in the faeces does not necessarily mean that they came from the alimentary tract.

The experiments of KOMÄREK showed that the larvae soon died in the absence of oxygen and he supported the view of PATTON and EVANS that Calliphorinae larvae cannot survive passage through the alimentary canal.

The author has carried out experiments on animals using larvae of *Lucilia sericata, Phormia regina, Calliphora erythrocephala, Sarcophaga*

securifera, Cochliomyia macellaria and *Drosophila melanogaster.* Larvae of one or other of these were given in food to dogs and cats, young and adult. In every case the larvae were found to be killed or immobilized in the stomach in three hours and those that passed on to the intestine were partially digested. In no instance did living larvae pass through. The symptoms which have been recorded as due to their presence in the alimentary canal must have other cause. *H. H. S.*

SOLLIER (R.). Sur un cas remarquable de myiase du conduit auditif par *Chrysomyia bezziana.* [**Myiasis of the Auditory Meatus.**]—*Rev. Méd. Française d'Extrême-Orient.* 1938. Oct. Vol. 21. No. 8. pp. 1016–1018.

MASSIAS (Ch.). Discussion de l'article du Dr. SOLLIER.—*Ibid.* p. 1019.

The author tells of a child of four years brought to hospital on account of ear discharge and pain. Examination revealed larvae and in the course of four days 87 were removed and found to be larvae of *Chrysomyia bezziana.* The unfortunate patient was also heavily infested with Ascaris and Trichuris. Dr. Sollier, discussing this case, speaks of other instances of myiasis in Indo-China due to *Chrysomyia megacephala.* *H. H. S.*

BERTRAM (D. S.). **A Note upon Myiasis due to the Larvae of** *Cordylobia rodhaini* **Gedoelst.**—*Ann. Trop. Med. & Parasit.* 1938. Dec. 21. Vol. 32. No. 4. pp. 431–435. With 2 figs. [17 refs.]

Larvae of *Cordylobia rodhaini* are not very uncommon in animals; they have been found causing myiasis in antelopes, *Cephalophus dorsalis* and *C. grimmi,* in the rodent *Cricetomys gambianus,* a rat *Rhynchocyon cirnei,* a squirrel *Heliosciurus punctatus* and others. Records of infestation of man are, however, rare. MACFIE in 1917 noted one in a native at Accra, and in 1932 SYMES and ROBERTS reported one in Kenya; other possible cases occurred in the Belgian Congo (1910 and 1916), in Uala and Ngoko, French Equatorial Africa (1913). The case here recorded is that of a man in Mamfe, Cameroons, from whom 16 larvae were taken and four of these were sent to the Liverpool School of Tropical Medicine for identification. They came from pustules on the neck and forearm of a man of 51 years. The specimens proved to be third instar larvae of *C. rodhaini*; one of these and a corresponding stage of *C. anthropophaga* are depicted and the differences are detailed in the text. *H. H. S.*

JOYEUX (Ch.), SAUTET (J.) & ARTAUD (P.). Sur un cas de myiase rampante. [**A Case of Creeping Myiasis.**]—*Bull. Soc. Path. Exot.* 1938. Dec. 14. Vol. 31. No. 10. pp. 922–924. With 1 fig.

A child of 11 months, who had been staying during the summer in Corsica, was brought by its mother because she had noticed certain skin lesions for a fortnight. At the external superior angle of the left scapula was a subcutaneous raised ridge, sinuous, dark at one end, not inflamed; at the upper part of the front of the right arm was another similar lesion; and on the right cheek a similar but larger and inflamed ridge, scratching of which had produced an impetigo-like sore. The contents of the two first were removed and proved to be

larvae of *Gastrophilus haemorrhoidalis*. The third gradually cleared up by local treatment with Dakin's solution. In the summer the child had lain on the ground with little or no covering. *H. H. S.*

FIALHO (Amadeu). Blastomicose do tipo "Jorge Lobo." [**Blastomycosis of the "Jorge Lobo" Type.**]—*Hospital.* Rio de Janeiro. 1938. Oct. Vol. 14. No. 4. pp. 903–918. With 10 figs. [14 refs.] French summary.

In 1933 Jorge LOBO published (*Anais Brasileiros de Dermat. e Sif.* No. 4,6) the case of a man of 52 years who for 19 years had had a painful nodule over the sacrum. It was removed surgically, but two years later recurred and lesions became multiple, mostly of a keloid character, but some had a thick purulent discharge. Jorge Lobo grew from this a peculiar blastomycete on Sabouraud's medium.

From the case described in the present article the same fungus was grown. The patient was a white man, a native of Brazil in poor circumstances, who twelve years before had noticed two painless "tumours" of the right pinna. After growing for some years they had not increased in size, and had not affected his general health. One, on the posterior aspect, was as large as a hen's egg, reddish-violet in colour, lobulated but made up of masses from a millet to a hazel-nut in size. From the lobule was another of similar character, both were pedunculated and painless. They were removed and the wound healed up in a month. The characters of the fungus, in the tissues and on growth on artificial media, are detailed and depicted. The elements are spherical, on an average 10μ in diameter, with a thick capsule, often in short chains or small groups, with giant cells at the periphery. As it appears to be a new type of mycosis the author suggests naming it the Jorge Lobo type after its first discoverer. *H. H. S.*

DICKSON (Ernest C.) & GIFFORD (Myrnie A.). **Coccidioides Infection (Coccidioidomycosis). II. The Primary Type of Infection.**—*Arch. Intern. Med.* 1938. Nov. Vol. 62. No. 5. pp. 853–871. With 7 figs. [14 refs.]

The first communication by the author on this subject has been referred to in this *Bulletin* [1938, Vol. 35, p. 459]. In the present one is described the clinical and pathological condition. Infection is by inhalation of chlamydospores and the primary localization is pulmonary. A common locality is the San Joaquin Valley, California, and the disease goes by the name of "valley fever" or "desert fever." In 16 months from 1st January, 1936, 75 physicians reported 354 cases. The early symptoms are those of a severe cold or "influenza," with headache, general pains, pain in the chest or throat, cough and perhaps conjunctivitis. The sputum varies in quantity, and may be bloodstained. After a temporary improvement, and about 8–15 days from the onset, erythematous nodules develop, mostly on the shins, but also on thighs and at times on scalp, and arms and upper part of the thorax; they fade in 48–72 hours leaving brownish pigmentation. Diagnosis is rarely made till this rash appears. X-ray examination may reveal pulmonary opacities suggestive of tuberculosis and enlargement of the hilar glands. The reaction to coccidioidin, a specific

antigen prepared from the fungus, is positive and may be very marked. A large majority of the patients recover completely, but occasionally a coccidioidal granuloma may develop and cause death with symptoms of meningitis. *H. H. S.*

DICKSON (Ernest C.). **Primary Coccidioidomycosis. The Initial Acute Infection which Results in Coccidioidal Granuloma.**—*Amer. Rev. Tuberculosis.* 1938. Dec. Vol. 38. No. 6. pp. 722–729. [20 refs.]

A further account of this interesting condition of which the author has made a special study. It is now close on ten years since he reported on the *Mimicry of Tuberculosis by Coccidioidal Granuloma.* He has shown that the main endemic site is the San Joaquin Valley, California. By 1931, of 296 cases, 254 had originated in that State, and by 1936 of 450 cases in California 224 had died. It has been observed also in cattle and sheep, but no record is known of animal to man, man to man, or man to animal infection. That infection can occur by inhalation of spores was proved in the author's laboratory where a worker inadvertently became infected by inhaling over an open Petri dish culture. Early symptoms are of an "influenzal" type, with fever (100–104°F.) and general aching and malaise, followed by bronchitic symptoms and sputum mucopurulent and at times blood-streaked. In 8–15 days an erythematous rash like erythema nodosum, and known as "the bumps," appears, commonly on the shins, but it may occur elsewhere. X-rays of the chest reveal hilar shadows. Most patients seem to recover completely, but some develop a granulomatous condition of the lungs and of these the fatality is about 50 per cent. *H. H. S.*

HYNES (Kyran E.). **Coccidioidal Granuloma.**—*Northwest Med.* 1939. Jan. Vol. 38. No. 1. pp. 19–21. With 4 figs.

HARE (K. P.). **Preliminary Report on an Experiment in Coolie-Line Sanitation.**—*Indian Med. Gaz.* 1938. Oct. Vol. 75. No. 10. pp. 609–611. With 3 figs.

The three major scourges of the Assam Valley tea estates are malaria, dysentery and hookworm disease. The helminth infestation rate is nearly 100 per cent. The installation of tube well water supplies has reduced the incidence of dysentery and some other intestinal infections. Communal latrines of several types have been tried but all were disapproved by the coolies and seldom used. Recently bore-hole latrines, one for each family, have been installed in one coolie line with a total population of 130. The dwellings in this line are semi-detached and the latrines were accordingly built in pairs. Squatting plates set in cement surmount the bore-holes which vary in depth from 14 to 20 feet. The walls of the latrine were built of sundried brick, except for the foundation and two corner pillars which were made of hard brick. Winged walls obviated the necessity for a door and there was no roof. The absence of roof lessened cost, allowed cleansing of the squatting plate by rain and met the coolies' sentiments as to the

impropriety of defaecating in a house. Such latrines can be constructed at a cost of about 10 rupees (15s.) per family. They have been popular and the coolies take a pride in keeping them clean.

Norman White.

WATSON (Malcolm). **Modern Tropical Hygiene.**—Reprinted from *Post-Graduate Med. Jl.* 1938. Nov. 8 pp.

This article, by laying stress on certain main features, on the application of principles, and passing over or merely implying details, serves a very useful purpose though it does not adduce—it does not pretend to—any fresh evidence or suggest new measures. Sir Malcolm Watson to illustrate his theses takes, first, malaria, the prevention of which, in Malaya particularly, is so largely due to his work and advice; second, trypanosomiasis, and, third, plague, as examples of infections transmitted by different genera of vectors.

Under the first he speaks of the surprisingly good results in "a small town on the Malay Peninsula" [? Klang] in the opening years of the present century, following properly planned and executed drainage schemes. A few years later, in 1909, abolition of breeding sites for mosquitoes was effected by putting in pipes underground all streams and springs within half a mile of inhabited buildings, the vector having been found to be a mosquito which selected fast-running water for oviposition. In fact on the principle of *autres pays autres moeurs*, from the Anopheles view, *species sanitation* (a name given by the Dutch) found successful application when scientifically controlled. The author shows, what is well known but not always acted upon, that large scale research and reclamation need the whole-hearted co-operation of the administrator, the medical officer, the entomologist, the engineer, the forest officer, the agriculturist, and, a point not to be forgotten or minimized, the tribes who own the land.

In 1901, in Klang and Port Swettenham, deaths from fever numbered 368 out of a total of 582. Anti-malaria work was then begun and by 1905 fever accounted for only 45 deaths, and the benefit as regards other diseases is shown by the fact that total deaths were but 113, or less than one-third of those due to fever alone four years earlier. This work it was which, basically, made feasible the construction of the Naval Base at Singapore.

The economic effects are best expressed in the words of the Governor in 1926:—

"'It must be obvious to all who are acquainted with the conditions that prevailed in the Malay Peninsula during the concluding decades of the nineteenth and the opening years of the present century that developments such as the rubber industry, which in so short a space of time has spread over so enormous an area, would have been totally impossible unless the danger of malarial infection had first been successfully combated.' Between 1920 and 1930 the British Empire produced 75 per cent. of the world's rubber and America consumed some 300,000 tons a year."

Similarly, speaking of sleeping sickness, the author tells of twenty-one species of tsetse in Africa and of the value of—more, the necessity for—species sanitation for exterminating, or at least preventing the spread of, the fly.

The article is an instructive summary of these aspects of present-day tropical hygiene. *H. H. S.*

ACHARD (Ch.). Voyage médical en Afrique noire (Congo belge, A.E.F., Cameroun). [**Medical Tour in Belgian Congo, French Equatorial Africa and Cameroons.**]—*Bull. Acad. Méd.* 1938. Dec. 6. 102nd Year. 3rd Ser. Vol. 120. No. 36. pp. 381–399.

The author compares the staff of doctors in Belgian Congo and in the French African Colonies. With the French, all go through the same medical training during which they acquire *esprit de corps* and make life-long friendships. In the Belgian Congo many of the doctors are foreigners; the only criterion is the possession of a diploma equivalent to the Belgian doctorate. Consequently they meet only during the course of instruction at Antwerp in tropical medicine. They do not form a corps subject to a common discipline and they enter the service not as a lifelong career, but with a view to returning to Europe. He notes also that many of the doctors in Belgian Congo are in the employ of commercial companies or of religious missions or of private societies. An interesting account of the medical organization of the two French Colonies does not lend itself to summarization. It is particularly noted, however, that in French Equatorial Africa there is a serious deficiency in native personnel. Indeed, it is stated that out of 641 *infirmiers* chosen as suitable for stations without doctors, 10 were set apart of whom only three passed a test and those proved to be "without medical value." Instruction must be organized from the primary school upwards.

A brief account is given of the diseases met with in the two French colonies. *A. G. Bagshawe.*

MEDICAL AND SANITARY REPORTS.

HONG KONG (1937).

Hong Kong is one of a number of islands off the south-east coast of China, at the mouth of the Canton River, about 91 miles south of Canton and 40 east of Macao. Hong Kong is 11 miles long and from 2 to 5 miles wide and has an area of about 32 sq. miles. It is separated from the mainland of China by the Lyeemoon Pass. The peninsula of Kowloon on the mainland, area 2¾ sq. miles, forms part of the Colony, together with the adjacent New Territory. The whole Colony has an area of about 345 sq. miles.

Introductory.—In previous Summaries, attention has been drawn to the fact that so often the text of the Report has remained unchanged year after year (see this *Bulletin*, 1936, Supp., p. 197*, 1937, Supp., p. 203*, and 1938, Supp., p. 214*). It is pleasing to note that the Report for 1937 conspicuously avoids the repetitive methods characterizing its predecessors, and strikes an original note by introducing appropriate and informative discussion of the outstanding features of public health experience, and discriminating commentaries upon the components of public health organization in the Colony, for the year under review. It is of no little significance to note that, instead of requiring a considerable extension of printed matter for the presentation of these welcome features, space has been economized with such notable success that without sacrificing any feature meriting inclusion, by comparison with its immediate predecessor, the 1937 Report is a slimmer volume by 60 pages, thus representing a saving of about 27 per cent.

Vital Statistics.—This section has undergone complete revision. The difficulties attending attempts to make an annual estimate of the Chinese population—difficulties enormously increased for the year under review when a serious refugee problem developed as the result of the Sino-Japanese disturbances—are discussed, together with a brief description of the system applied for the registration of births and deaths. As an example of the importance of the part played by local customs or practices in influencing the interpretation of assembled facts and of the value of explanatory text in such connexion, a brief note relating to the birth registration among the Chinese population in Hong Kong is of particular interest. It is explained that partly as a result of ignorance or laziness, and partly owing to the Chinese custom of postponing the event until the child is in its second year, birth registration is still incomplete.* On the other hand, since the outbreak of Sino-Japanese hostilities, the tendency has developed amongst the Chinese to secure registration of births in Hong Kong "as a preliminary step towards claiming British nationality, even when the evidence of local birth is of the most slender."

* [But it is to be noted that the Chinese method of reckoning age adds a variable number of months to the true age, one year being added at the time of birth and another on the first subsequent Chinese New Year's day, so that a child born say in January 1937 is said to be one year old at birth and two years old on the Chinese New Year's day in February 1937 and one born say in March 1937 remains one year old up to New Year's day in February 1938 when it becomes two years old by Chinese reckoning. A formula and tables for converting Chinese ages to their European equivalents are given by Stevenson and P'an Ming Tzu in the *Chinese Medical Journal*, 1926, Vol. 40, pp. 128–130, 1207.]

The relevant vital statistical data for 1937 may be summarized as follows :—

Estimated Populations.

Item	Island of Hong Kong	Kowloon and New Kowloon	New Territories	Maritime	Totals for the Colony
Non-Chinese ...	9,847	10,887	476	1,372	22,582
Chinese	437,982	339,366	107,052	100,000	984,400
Totals	447,829	350,253	107,528	101,372	1,006,982

Births, Deaths, and Infant Deaths.

Item	Births	Birth Rate	Deaths	Death Rate	Infant Deaths	I.M.R.
Non-Chinese ...	692	30·6	244	10·8	30	45·9
Chinese ...	31,611	32·1	34,391	34·9	11,620	376·0
Totals ...	32,303	32·1	34,635	34·4	11,650	369·2

The *registered births* include 744 post-registrations after 12 months, *viz.*, 705 Chinese and 39 Non-Chinese ; these have been deducted when calculating the infant mortality rates. As regards *registered deaths*, the monthly average for the first seven months was 2,349 and for the last five months 3,638. The refugee problem and the typhoon were largely responsible for the increase (see also hereafter under *Public Health*).

European Officials resident in the Colony numbered 940 with an average number resident of 918. Seven were invalided and three died.

In an *Appendix* to the Report under review the Registrar-General supplies the demographic facts for 1937 in considerable detail.

Maternity and Child Welfare Work.—In Hospitals under Government and voluntary control, 358 beds were available for maternity cases in 1937, while additional accommodation was also available in a large number of maternity homes ; of the latter 75 were inspected during the year. At Government Hospitals 4,230 women appear to have been treated for *diseases of pregnancy and the puerperal state* (with 14 deaths), 3,679 being cases of normal labour. At Chinese Hospitals among 6,439 cases (38 deaths), 6,079 were cases of normal labour. Large numbers of ante-natal and other cases are seen in the out-patient departments of the Maternity blocks of the various hospitals and at Government and Chinese Dispensaries.

As from the 1st January, 1937, the *practice of midwifery* habitually and for gain (by unregistered persons) became a punishable offence. "*Wan P'os*" or handy women who had practised midwifery in Hong Kong for two or more years previously and who enrolled as *midwives* were exempted from this prohibition ; 111 Wan P'os took advantage of the concession and were enrolled. At the examinations of the Midwives' Board, 37 candidates were successful ; at the end of the year the names of 395 women were on the Midwives' Register. The

16 midwives employed by the Medical Department provide free services at the homes of poor women and children, and when not engaged in maternity and child welfare work, assist in first-aid work at the dispensaries.

Ante-natal and infant welfare work continues to be carried out at a large number of centres. Personal hygiene and mothercraft are taught to the women attending these centres.

School Hygiene.—The School Hygiene Branch (comprising one European and two Chinese Health Officers, a part-time Lady Medical Officer, and five Nurses) is responsible for the medical supervision of school-children, and the inspection of school premises. With this limited staff responsible for a school population exceeding 86,000 attending over eleven hundred schools, it is clear that it is possible to examine only a small proportion of the children. During the year 5,802 medical examinations were carried out in 18 Government schools. [There are 21 Government schools, 19 Grant-in-Aid schools, and 1,137 private schools in the Colony.] Dental defects and visual disorders were the conditions most frequently met with. The establishment of a School Dental Department under the charge of a Government Dental Surgeon is recommended. At the various School Clinics attendances of scholars for examination and treatment totalled 2,780, while in addition 76 visits were paid by School Nurses to the homes of scholars.

At the request of the Education Department a large number of premises being used as schools (presumably as private schools) were inspected, and many of them found to lack the elementary amenities demanded for the proper accommodation and instruction of young people. It is hoped to amend existing legislation on the subject of school hygiene to ensure that reasonable standards shall be maintained in all schools, for as the Report rightly observes, "It cannot be emphasized too strongly that by far the best method of teaching hygiene to scholars is by ensuring that the school premises themselves are satisfactory from the public health standpoint."

Public Health, Sanitation, etc.—Dr. P. S. SELWYN-CLARKE, the newly appointed Director of Medical Services, describes the exceptional difficulties with which the public health authorities had to contend, and the unusual factors which combined to influence adversely the health of the community and to give rise to an increased amount of morbidity and mortality during the year under review. The continuance of the Sino-Japanese hostilities and their increasing intensity drove large numbers of refugees to seek a haven in Hong Kong; their influx served to aggravate insanitary conditions in the already congested urban areas. Refugees from areas in China where health services had become disorganized brought with them the seeds of dangerous infections—disastrous cholera and smallpox epidemics resulted. In September a typhoon of exceptional severity devastated the Colony, and while no accurate estimate of the loss of life is possible, it may be noted that the bodies of some 490 persons who had been killed or drowned were picked up along the harbour foreshore. Even the most adequately staffed and wisely organized public health service would have found it difficult to maintain essential services and at the same time successfully cope with a series of calamities of this order, but in Hong Kong the anomalous arrangements underlying some of the components of public health administration (see this *Bulletin*, 1935, Supp., p. 191*), must have served to intensify the problems of efficient control. The

whole of the European and Asiatic Sanitary Inspectorate, while *theoretically* grouped round the Health Officers, in actual *practice* are not controlled by Medical Officers of Health but by a layman, the Chairman of the Urban Council of Hong Kong. The present system is unsatisfactory from every point of view—Medical Officers of Health working under these conditions may be likened to Army Officers endeavouring to carry out their complex duties deprived of their N.C.O's. A more effectively organized and adequately staffed sanitary inspectorate *under the direct control of the Medical Officers of Health* would have been able to deal more successfully with such dangerous infections as smallpox and cholera which during 1937 and in recent years have exacted so heavy a toll of life and suffering. Re-organization of the Health Division with the sanitary inspectorate under the direct supervision and control of the Medical Officers of Health is urgently recommended.

Anti-malarial work continued to be carried out under the auspices of the Malaria Bureau with unabated energy; in the report of the Malaria Bureau these activities are described in detail.

The objectionable bucket system of *sewage disposal*—which continues to function in the majority of tenements and shop-houses—and local methods applied for the collection and removal of night-soil, are the subject of description and criticism. The present systems constitute grave sources of danger to the public health, and steps are being taken to investigate the possibility of introducing drastic changes which envisage sewer disposal. Methods of *refuse disposal* are discussed and the defects of existing arrangements exposed. The system is capable of improvement, and steps are being taken to this end.

The completion of the Shing Mun Jubilee Dam during the year marked a notable stage in the development of public health utilities in the Colony. *Water supplies* are now adequate, for the impounding reservoirs (8 on the island and 5 on the mainland) have a combined storage capacity of 5,971 million gallons.

Matters concerned with *housing and town planning* are discussed at some length and various recommendations for future work in this field are outlined. These include new legislation to control town planning, etc., and schemes for slum clearance. It may be noted that at present the Sanitary Department (see above) has little or nothing to do with housing other than the removal of obstructions.

During the year special bye-laws were drafted restricting the sale of certain *foods and drinks* with a view to minimizing the risks of infection through their use. Draft legislation which sought to make the pasteurization of milk compulsory met with considerable opposition; the proposals will probably become effective in 1938. Much information of value is expected to be made available following the investigations of the *Nutrition Research Committee.*

The curiosities of organization characterizing the Sanitary Department (see above) are seen in another direction; health conditions in markets are under the control of the Colonial Veterinary Surgeons instead of under the Health Officers. Until the reorganization of the Health Division has been carried out and the sanitary inspectorate brought under the supervision and control of Medical Officers of Health, the effective *training of sanitary personnel* cannot be provided for.

Port Health Work.—Services continued to function as usual. Due to the Sino-Japanese disturbances a decrease in the number of ships

entering the Port is recorded. The principal items of work concerned with shipping during the year may be summarized as follows :—

British ocean-going ships entering and clearing ...	4,322
Foreign „ „ „ „ „ „ ...	5,202
Other vessels entering and clearing	24,258
Total tonnage dealt with	36,191,724
Emigrants examined	245,488
Emigrants rejected	1,153

Several new *air services* were inaugurated during the year ; no cases of infectious disease were discovered in passengers or crews of aircraft. The volume of aerial traffic dealt with during 1937 may be gauged from the following data :—

	Arrivals.	*Departures.*
Aircraft	398	395
Crews	1,150	1,133
Passengers	1,929	1,756

Hospitals, Dispensaries, etc.—In the words of the Report under review, " The outstanding event in the year as regards improved hospital facilities was the opening of the Queen Mary Hospital, which replaced the old Government Civil Hospital, built in 1874, and which was closed on the 30th of June 1937."

The Queen Mary Hospital, which embodies all the latest improvements in hospital construction and equipment, has accommodation for 546 beds ; an Isolation Wing consisting of nine small wards accommodates 22 patients. About a quarter of the beds in the new hospital are allotted to the Medical, Surgical, and Gynaecological and Obstetrical clinical units of the Hong Kong University. Private practitioners are privileged to make use of the Maternity Wing for the treatment of their own cases.

The first patients were admitted in May 1937 from the Victoria Hospital ; by the end of June all the patients had been transferred to the new hospital from the old Government Civil and Victoria Hospitals.

The returns for Government and Chinese Hospitals are presented in *Appendices* to the Annual Report. For present purposes it must suffice to summarize briefly the record of the year's work by stating that to *Government* hospitals during 1937 admissions numbered 17,832, cases treated 18,275, and hospital deaths 1,637. Out-patients treated at Government Hospitals exceeded 130,000 ; these are exclusive of out-patients treated at special clinics, dispensaries, etc. At *Government Dispensaries* alone 59,618 patients were dealt with.

A new and informative account of the origins and subsequent development of the *Chinese Hospitals and Public Dispensaries* is a feature of the Report under review. Dangerous overcrowding characterizes many of the Chinese hospitals and it is observed, it is not at all uncommon " to see two patients, young and old, in the same bed, five adult women in two beds pushed close together, patients lying all over the ward floors so as to render separation of types of disease and medical attention and nursing, matters of extreme difficulty." In one case 61 patients were found in a ward of 12 beds ! This distressing state of affairs is in urgent need of reform and it is hoped steps may be taken to improve existing conditions in the near future. To the *Chinese Hospitals* 46,849 patients were admitted, 47,969 were treated and 12,641 died during 1937. The *Chinese Public Dispensaries* dealt with 264,589 new and 238,527 old cases during the year under review.

Mention has already been made of the fact that owing to exceptional circumstances the public health suffered a set-back during 1937 (see *Public Health* above), and that during the late summer a marked increase in morbidity and mortality experience was noted. As regards the principal diseases responsible for disease and death, the notes which follow briefly summarize the more extensive commentaries provided in the Report under review.

A serious outbreak of *cholera* occurred. The disease was first recognized in July, though it is significantly observed " notifications of dysentery had already shown a marked increase in June." In July, 13 cases were reported, in August 1,100, and in September 500; thereafter incidence declined rapidly and only one case was notified in December. Altogether 1,690 persons were affected and 1,082 died. Undoubtedly the epidemic was one of the legacies of the disturbed conditions in China—the infection was probably introduced by refugees from South China. Extensive preventive measures were instituted and energetically applied. Over a quarter of a million inoculations were carried out at hospitals, public dispensaries, and at centres staffed by the St. John Ambulance Association and Brigade. Having regard to the inadequacy and faulty organization of the sanitary staff, insanitary methods of night-soil disposal, etc., what is surprising is not the sudden development of the epidemic to alarming proportions, but the success which followed the application of control and preventive measures in a dangerous situation.

Cases of *smallpox* were notified in Hong Kong during every month of 1937 with the sole exception of October. The largest monthly total was recorded in April, though a second and, as it proved, more serious peak occurred in December. Altogether 129 cases with 94 deaths were notified during the year. Nearly half a million persons were vaccinated, and in this connexion it may be noted that 21,232 (or 75 per cent.) of the infants registered during the year were vaccinated. The exceptionally high case-mortality rate is suggestive of many missed cases; a more effectively organized sanitary inspectorate would prevent concealment of cases and would lead to the discovery of all contacts.

Though during 1937 *typhus* was rife in many parts of China, no case of the disease was reported in Hong Kong. Sporadic cases of *cerebro-spinal* fever occurred throughout the year, with March and April the months of maximum prevalence. Notified cases numbered 157, and 88 of the patients died. No case of *plague* was recorded; the systematic trapping of rats and other anti-plague measures continued to be carried out as usual.

Diphtheria was responsible for 308 cases with 148 deaths; maximum incidence occurred in the period November–March. Of the total cases notified 241 were treated in hospitals with 112 deaths. Eight non-fatal cases of *scarlet fever* were notified.

Malaria.—The anti-malarial works carried out under the direction of the Malaria Bureau since its establishment in 1930 have succeeded in making malaria a relatively unimportant disease in urban areas. The infection rate still remains high in some rural areas where anti-malarial activities continue to receive vigilant attention. The Report of the Malaria Bureau describes the year's work in detail. To Government Hospitals 677 cases were admitted and 695 treated with 23 deaths, while the corresponding figures for Chinese Hospitals were 1,892, 1,931 and 328 respectively. The distribution of types of

infection among the 695 cases in Government and the 1,931 cases in Chinese Hospitals reads as follows :—

	Benign Tertian	Quartan	Subtertian	Cachexia	Undefined
Government Hospitals	206	8	309	121	51
Chinese ,,	286	7	1,083	47	508

At the Government Bacteriological Institute 8,917 blood films were examined for the presence of malaria parasites, and in 3,581 cases positive findings were recorded. In the Report of the Bacteriological Institute a graph is interleaved showing the percentage relation of the different types of malarial parasites to each other, month by month throughout the year, and also the rainfall in inches (see also this *Bulletin*, 1938, Supp., p. 217*).

July to October were the months of maximum incidence of fevers of the *enterica group* ; during the year 464 cases with 176 deaths were reported. Government Hospitals dealt with 84 in-patient cases of typhoid and 6 of paratyphoid with 20 deaths, and Chinese Hospitals with 211 cases of typhoid with 106 deaths. At the Bacteriological Institute where 1,539 samples of serum were tested for the specific agglutinins of the enteric bacilli, 344 were positive with *Bact. typhosum*, 6 *Bact. paratyphosum A*, 3 *Bact. paratyphosum B*, and 62 type undetermined. The investigation into the presence of agglutinins against typhoid organisms in cases showing no clinical signs of the disease was continued (see this *Bulletin*, 1938, Supp., p. 219*).

Preceding the cholera epidemic, a significant rise in the reported cases of *dysentery* was observed (see above *Cholera*). During the year 576 cases were notified (see below) and according to the Report of the Registrar-General 316 deaths were ascribed to the disease. According to the Hospital returns the majority of the cases were bacillary infections, viz. :—

	Amoebic	Bacillary	Undefined	Total	Total deaths
Government Hospitals	3	117	4	124	16
Chinese ,,	165	326	237	728	234

At the Bacteriological Institute where 3,758 faecal specimens were cultured for pathogenic organisms, 134 were *Bact. dysenteriae* Flexner, 11 Shiga, and 17 Schmitz infections.

Tuberculosis was responsible for one in every eleven deaths due to all causes. Cases treated in hospitals may be summarized as follows :—

	Government Hospitals		Chinese Hospitals	
	Cases	Deaths	Cases	Deaths
Pulmonary tuberculosis ...	193	61	3,653	1,698
Other forms ,, ...	122	26	753	292

Overcrowded living conditions and under-nourishment coupled with the exceedingly common habit among the Chinese of spitting in public places combine to spread the disease. Hospitalization of any but a very small proportion of the infectious patients is at present not possible. At the *Bacteriological Institute,* 174 out of 687 specimens of sputum examined were positive with *Myco. tuberculosis.*

The number of patients treated in Government and Chinese Hospitals, for various *helminthic infections* was negligible, totalling 317. Among 101 cases in Government Hospitals were 40 cases of *ascariasis* and 35 of *ankylostomiasis,* while among 216 cases dealt with in Chinese Hospitals, 102 were treated for ascariasis and 44 for ankylostomiasis. Thirty-five patients were treated for *clonorchiasis* (8 in Government Hospitals). Among 2,407 faecal specimens examined at the Bacteriological Institute 170 contained ascaris, 104 clonorchis, 42 trichuris, 31 ankylostoma, and 89 were multiple infections.

Little is known of the amount of *leprosy* in Hong Kong (see this *Bulletin,* 1937, Supp., p. 209*), and until a systematic survey is carried out, the situation so far as this disease is concerned must remain conjectural. The question of obtaining the help of the British Empire Leprosy Relief Association to carry out such a survey is under consideration. Out of 154 specimens of nasal and skin smears examined at the Bacteriological Institute, 50 were positive with *Myco. leprae.*

Venereal diseases.—The facilities for free medical advice and treatment remained as previously described; details of the year's work at six centres may be summarized as follows :—

Centre	New Cases		Attendances	
	M.	F.	M.	F.
Queen's Road (Old Govt. Civil Hospital)	1,241	570	5,838	2,621
Violet Peel Health Centre	1,348	657	7,646	2,375
South Kowloon (Docks) ...	2,228	481	10,453	2,280
Kowloon Hospital ...	347	834	1,752	3,201
Taipo Dispensary	28	2	391	15
Un Long Dispensary ...	21	5	171	28

In-patients treated at Government Hospitals for *syphilis* numbered 127, for *soft chancre* 112, and for *gonococcal infections* 207; at Chinese Hospitals the corresponding figures were 234, 30 and 62 respectively. At the Bacteriological Institute an interesting comparative study was carried out on the recently described *Ide precipitation test* for syphilis. One thousand sera were tested in parallel with the Kahn test, and the following results recorded :—

	Kahn test	Ide test
Strong positive ...	214 } 347	243 } 384
Positive...	133	141
Doubtful	44	51
Negative	609	565
Total	1,000	1,000

Kahn tests were applied to 16,581 samples of blood serum; 4,345 gave positive, 723 doubtful, and 11,513 negative reactions. In addition 617 smears were examined for the presence of the gonococcus, but findings do not appear to have been recorded.

Other Diseases.—Under this heading mention should be made of the fact that deaths due to *diseases of the respiratory system* occupied the first place in the list of causes of death, and were responsible for 10,380 deaths during the year under review. *Beriberi*, including the infantile variety, constitutes a serious problem, and no fewer than 1,661 deaths were ascribed to this cause in 1937. In the Table below the cases and deaths recorded in hospitals for certain respiratory affections, and for beriberi, are summarized :—

Disease.	Government Hospitals		Chinese Hospitals	
	Cases	Deaths	Cases	Deaths
Bronchitis	246	2	3,684	1,050
Broncho-pneumonia ...	160	105	2,633	1,890
Pneumonia (Lobar and Undefined)	102	40	940	517
Beriberi	93	13	2,807	915

Scientific.—The four separate Reports discussed under this title are the following :—

(a) *The Report of the Bacteriological Institute* records a further increase in the volume of work dealt with during the year, when 42,096 specimens of various kinds were examined and reported upon. Under such headings as *malaria, enteric fever, dysentery, etc.*, in the preceding notes, mention has been made of specific examinations and of findings recorded.

(b) *The Annual Report of the Malaria Bureau* confines itself to discussion of new developments during 1937. This work included the collection and identification of anophelines, actual methods employed in anti-malarial work, the results of precipitin tests on bloods from mosquitoes caught in various localities, and dissections made to discover the presence of malarial infection of anophelines.

(c) *The Report of the Analytical Laboratory* describes the nature and volume of the year's work under various headings, *viz.*, Official (*i.e.* Government work) semi-official work for the Naval, Military and Air Force Authorities, and unofficial work which is concerned with analyses carried out for local firms and private individuals in the Colony.

(d) *The Report of the University Clinical Units* comprises the separate Reports of the Professors in charge of the Medical, Surgical and Obstetrical and Gynaecological Units respectively; the year's work for each of these units is dealt with in detail.

Financial.—Total expenditure on Medical Services—which includes such items as water and drainage works, Urban Council cleansing services, etc.,—amounted to $5,198,816, a sum which formed 16·2 per cent. of the revenue of the Colony from all sources during 1937.

P. Granville Edge.

REVIEWS AND NOTICES.

WEYER (Fritz) [Wissenschaftl. Assistent am Tropeninstitut Hamburg]. **Die Malaria-Ueberträger. Eine Zusammenstellung der wichtigen Anopheles-Arten mit Angaben ueber Verbreitung, Brutgewohnheiten, Lebensweise und praktische Bedeutung.** [Vectors of Malaria.] Mit Geleitworten von Prof. Dr. P. MÜHLENS und Prof. Dr. E. MARTINI.—141 pp. With 15 figs. 1939. Leipzig: Georg Thieme, Verlag. [Unbound Rm. 8.40; Bound Rm. 9.80.]

The purpose of this work is to provide a concise statement of the facts at present known about those mosquitoes which are concerned in the transmission of malaria in all parts of the world. This was last done by Covell (1928 & 1931) and in recent years not only has knowledge been considerably advanced in many regions, but in some respects, notably in the increasing importance ascribed to "races" or "varieties" within a given species, the point of view has been appreciably modified. Its purpose is very competently achieved. The book begins with an essay of some fifteen pages reviewing, in an interesting style, with examples from all countries, the various factors that determine whether a given species is important in a given locality. Then follows a table occupying ten pages in which the malarious regions of the world are set out by continents and the carrier species set out under each country with a few words of comment in each case. Chapter 3 forms the kernel of the book and consists of an alphabetical list of the proved malaria carriers, 46 in number, the distribution, breeding places, behaviour of the adult insect, and relation to malaria being summarized. These descriptions vary from one to eight pages in length and contain a vast amount of accurate information with reference to original sources. It is particularly useful that the types of water used for breeding in the different localities are described in some detail. Chapter 4 contains brief accounts of 24 additional species which are of less importance or whose relation to malaria is not fully established. There are no keys for the identification of species; illustrations are given of some fifteen species, each with a very brief description, but apart from lightening the text, these serve little purpose. As a work of reference the book should prove of great value to all students in this field. In a foreword Professor Martini commends the continued study of Anopheles to "any people which will leave its homeland and achieve colonial successes on the world's stage." *V. B. Wigglesworth.*

MARSHALL (J. F.) [C.B.E., M.A., F.R.E.S., Director, British Mosquito Control Institute, Hayling Island, Hants.]. **The British Mosquitoes.**—pp. xi+341. With 20 plates & 172 figs. 1938. London: Printed by Order of the Trustees of the British Museum. [One Pound.]

W. D. Lang's "Handbook of British Mosquitoes," which was published in 1920, has been for some time out of print. This volume is a revision of Lang's Handbook, but it incorporates so much new material that it is in effect a new book. The subject is covered in great detail. The book begins with an elementary introduction in which the life history of the mosquito is described, together with the external and internal anatomy at all stages, and a detailed account of

those parts which are used for identification. Then follows an exhaustive and advanced systematic account of the 29 species of mosquito that occur in this country, which makes possible their identification as adults, larvae and in some cases as eggs and pupae. The natural history of each species is fully described and the whole is splendidly illustrated with line drawings, photographs and coloured plates. A short chapter of ten pages is devoted to those methods of control which have been found most practicable in dealing with the mosquito pests of this country; and in a final chapter a number of problems in the biology of mosquitoes, particularly the swarming habits of the various species, are discussed. This section contains a brief review on malaria in Britain. The book as a whole will be indispensable to any serious student of mosquitoes in England, whether he is concerned with their systematics or with their control. The *special* sections which form the bulk of the book will not, of course, concern the worker in the tropics; and *general* questions in mosquito bionomics form only a very small part of the whole.

V. B. Wigglesworth.

MANSON-BAHR (Philip) [C.M.G., D.S.O., M.D., F.R.C.P., Senior Physician to the Hospital for Tropical Diseases, London, etc.]. **The Dysenteric Disorders. The Diagnosis and Treatment of Dysentery, Sprue, Colitis and other Diarrhoeas in General Practice.** With an Appendix by W. John MUGGLETON, M.S.M., Technical Assistant.—pp. xiv+613. With 9 colour and 14 black & white plates, and 106 illustrations in the text. 1939. London, Toronto, Bombay, Melbourne & Sydney: Cassell and Company, Ltd. [25*s*.].

This volume embodies the experience of a life-time spent in the investigation and treatment of disease in persons from the tropics and subtropics, and has been written more especially for those engaged in general and in consultant practice who, from time to time, are confronted with conditions frequently inadequately dealt with in the usual standard works on medicine. The book consists of 522 pages of text matter, included in which are many photographic reproductions, charts and diagrams, and numerous excellent drawings in black and white, and in colour, by the hand of the artistically-gifted author; a number of these have already appeared in sundry publications. In addition, there are two appendices, occupying some 40 pages; one of these contains an account of the salient features of the morphology and life history of the parasitic intestinal protozoa of man, while in the other is given an account of certain of the laboratory procedures employed in the investigation of such cases as are referred to in the text.

The first four hundred pages of the work, after a general account of diarrhoea and dysentery and the methods employed in their investigation, are concerned with the epidemiology and geographical distribution, pathology and morbid anatomy, symptomatology, complications and sequelae, diagnosis, and treatment of the bacillary, protozoal and helminthic dysenteries, and of cholera, sprue and hill diarrhoea; conditions which are more particularly associated nowadays with the tropical zones, and therefore of which Dr. Manson-Bahr's extensive experience well qualifies him to write. The remainder of the volume is concerned with certain forms of colitis, with the steatorrhoeas and

coeliac disease, and with a variety of conditions giving rise to diarrhoeic or dysenteric symptoms. The whole is very freely interspersed with citations of illustrative cases seen by the author in his practice. As is to be expected in such a volume, the accounts of the more essentially tropical conditions consist of an elaboration of those already available to practitioners in this field and appearing in the standard work on Tropical Medicine of which the author is editor, rather than fresh contributions to knowledge of the subject. The treatise is well printed and bound, and singularly free from printer's errors, and the author has abundantly achieved his object of providing in a single volume a comprehensive account of the dysenteries and various forms of diarrhoeic conditions which form such a bewildering complex in general and consulting practice. *A. R. D. Adams.*

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